

Professor Elliott Smith

with kindest regards

from

H. J. Fleure

Geographical Distribution of Anthropological Types in Wales.

BY

H. J. FLEURE AND T. C. JAMES.

[WITH PLATES I-V AND MAPS IN THE TEXT.]

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GEOGRAPHICAL DISTRIBUTION OF ANTHROPOLOGICAL TYPES IN
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By H. J. FLEURE and T. C. JAMES.

INTRODUCTION.

THE subject has been studied by the great pioneer, Dr. John Beddoe,¹ with results which, so far as they go, are continually being confirmed by subsequent work, while other scientific workers, notably Professor Boyd Dawkins,² have stated their impressions and views at various times. In Scotland Messrs. Gray and Tocher³ have approached the subject from the point of view of pigmentation, while in Ireland Drs. Haddon and Browne⁴ have furnished detailed and accurate descriptions of a fairly limited number of individuals and have pointed the way to the study of individuals rather than of characters in masses of individuals. It is largely owing to the generous encouragement given to us by Dr. Haddon that the present research has been attempted and carried through thus far. One should mention also, in any introduction, the foundations so thoughtfully laid by Prichard,⁵ who in one place discussed skulls and other physical characters and in another summarized the then available philological evidence.

Abroad, extensive studies of a statistical type have been carried out, notable among these being the work of Collignon⁶ in France. The method usually followed has been that of the study of an individual character such as cephalic index or stature or brunetness in very large numbers of people, supplemented by less formal references to the occurrence of various cephalic indices with varying types of pigmentation and varying statures. It has been the character more often than the individual which has focussed the main attention of the workers, and this has led to the treatment of observations by the obvious method of district averages which are expected to bring out the dominant type and range of variation. Sergi⁷ has made

¹ Beddoe, J., *Races of Britain*, 1885.

² Dawkins, W. Boyd, *Journ. Roy. Anthropol. Inst.*, 1910, p. 233, and *Arch. Camb.*, 1912, p. 61; also *Early Man in Britain*, 1880; *Cave Hunting*, 1874.

³ Gray, J., and Tocher, J., *Journ. Roy. Anthropol. Inst.*, 1900, p. 104.

⁴ Haddon, A. C., and Browne, C. R., *Proc. Roy. Irish Academy*, series 3, vol. ii, several articles.

⁵ Prichard, J. C., *Researches into the Physical History of Mankind*, 5 vols., 1841.

⁶ Collignon, R., *Bull. Soc. Anthr.*, Paris, 1883, p. 463, 1890, p. 736, and *Mem. Soc. Anthr.*, 1894, No. 1, and 1895, No. 6, etc.

⁷ Sergi, G., *The Mediterranean Race*, 1901.

special efforts to advance beyond statistics and to study form. Older than this method of approach to the race problem is that of the examination of ancient skulls found in interments, the relative ages of which are judged by their positions and accompaniments. The classical studies under this head for Western Europe may be said to be *Crania Britannica*,¹ *British Barrows*,² *Reliquiae Aquitanicae*,³ *Anthropologica Suecica*⁴ and *Crania Ethnica*.⁵ It has been the natural endeavour of the two groups of workers to correlate one another's conclusions with their own. The archæologist, however, usually gives detailed, but necessarily incomplete, information about a small number of individuals; thus our description of the Palæolithic stocks in Europe is in reality based on observation of quite a small number of individuals, and it needs some faith in anticipation of future discoveries to accept often less than a dozen individuals of some type as determining for us a race of former inhabitants in Europe. That faith has been to some extent justified as confirmatory evidence has accumulated, but the conclusions need to be stated with reserve for some time. There is, however, the important point that the archæologist has tended to define his type as an individual, while the anthropologist has defined an agglomeration of characters without sufficient observation of the extent to which they occur together. A population in a given district may have a low average cephalic index and a low average stature, and the tendency is to describe a type with these two characters as a feature of the district. The conclusion is correct as far as it goes, but it is probably misleading in that it will ignore, let us say, a number of very narrow-headed people with a stature above the average, or, perhaps, a distinct sprinkling of brachycephalic types. In spite of these limitations it is, however, frequently attempted to correlate ancient and modern types and their distributions, and this is done with some success. The correlation is made with difficulty even by Ripley,⁶ who accepts the view that such characters as cephalic index are inherited in a fairly pure fashion. Relying upon published averages, Ripley emphasizes a supposed marked uniformity of head form in the British Isles, though he limits this sweeping statement shortly afterwards by adding that this is in so far as it is judged by the cephalic index. In consultation with Dr. Beddoe he has, however, identified representatives of ancient brachycephalic immigrants, but, apparently in obedience to published averages, he refers to broad-headed types as being almost extinct in the British population. It would thus seem to him that investigation of physical type or at least cephalic type in Britain is an almost hopeless method of studying race-history. Miss Semple,⁷ as a student of environment, utilizing Ripley's statements without his anthropological experience, refers to the uniformity of cranial type prevailing all over the British

¹ Davis, J. B., and Thurnam, J., *Crania Britannica*, 1865.

² Greenwell, W., and Rolleston, G., *British Barrows*, 1877.

³ Lartet, E., and Christy, H., *Reliquiae Aquitanicae*, 1875.

⁴ Retzius, G., and Fürst, C., *Anthropologica Suecica*, 1902.

⁵ De Quatrefages, A., and Hamy, *Crania Ethnica*, 1882.

⁶ Ripley, W. Z., *Races of Europe*, 1899.

⁷ Semple, E. C., *Influence of Geographic Environment*, 1911, p. 421.

Isles, saying that the cephalic indices range chiefly between 77-79, a restricted variation as compared with the points which represent the usual range for Central Europe, and so on. The implication in Miss Semple's book is given by the heading of the paragraph, which is: "Unification of Race in Islands." Ethnic intercrossing is given as a characteristic of island peoples; intimate contact among themselves in their compressed isolation is said to force an amalgamation of race culture and speech.

Boas,¹ after immense statistical study of immigrants into America, relying upon averages of individual characters for the most part, accepts that method as inevitable, but hints strongly that conclusions reached through it throw doubt upon the pure and persistent inheritance of such characters as cephalic form. "It would be saying too much to claim that all the distinct European types become the same in America, without mixture, solely by the action of the new environment. First of all we have investigated only the effect of one environment, and we have every reason to believe that a number of distinct types are developing in America Although the long-headed Sicilian becomes more round-headed in New York, and the round-headed Bohemian and Hebrew more longheaded, the approach to a uniform general type cannot be established because we do not yet know how long the changes continue and whether they would all lead to the same result. I confess I do not consider such a result as likely, because the proof of the plasticity of types does not imply that the plasticity is unlimited. The history of the British types in America, of the Dutch in the East Indies, and of the Spaniards in South America favours the assumption of a strictly limited plasticity." The underlying view here is that the type is plastic to a fairly large extent and that, through the influence of environment, a mixed population in virtue of this plasticity tends in some degree toward uniformity.

Such views if established would destroy the foundations of anthropological research for the elucidation of race history, and it becomes important to look into the question. We then find that the characters of Sicilian and Bohemian and Hebrew are average characters, and insufficient attention has been given to the fact that the range of individual variation within each of these groups may be very considerable and that in some instances an average is almost meaningless. The emphasis laid for so many years upon average values has nevertheless led to this fact being largely overlooked, and grave doubt is in consequence being thrown upon the value of physical anthropology for the purposes of race history.

Widespread attention has been given for social reasons in recent years to measurements of British children, and it is characteristic of the disrepute into which race study had sunk, or of the widespread acceptance of the notion of physical uniformity of the British type, that in several reports on these physical examinations little or no attempt is made to distinguish between the different race types. Children are compared very frequently with an "average child" and

¹ Boas, F., *Changes in Bodily Form of Descendants of Immigrants*, New York, 1912.

conclusions are reached showing that some district-average, already somewhat meaningless owing to mixture of type, is below what is supposed to be the general average. It is possible in some such cases that there may be a preponderance or at any rate an abundance of some type for which the measurements in question are normally small; but the tendency of the observer is more frequently to attribute the smallness to bad housing, imperfect nutrition, and so on. These factors are no doubt responsible for a great deal, sometimes in the direction of stunting and retardation, but no doubt also act differentially.

The importance of differential elimination as a factor affecting Boas' results is possibly great, and its powerful action through emigration as well as through death-rate in Britain recently is almost certain. We can also hardly be said to know anything as yet about the ontogeny of racial types: it is essential for us first of all to know what are our racial types, and the determination of these is still inadequate. Perhaps the present schemes of reports on school children are the best possible under existing conditions of ignorance, but the consequent limitation of their value should be borne in mind more generally than is the case at present.

As regards differential elimination, the potency of this factor has been recognized by students of the race history of the Eastern Mediterranean, and Von Luschan¹ gives a tragic instance of the migration of one thousand Circassian families into Western Asia near Islahiye in 1880, after the fall of Shamyl. In 1910 about seven families in a wretched state of fever and disease were all that remained. A study of cephalic indices and other physical characters near Islahiye in 1880 and in 1915 would probably have revealed striking differences due in this case undoubtedly to differential elimination. It must remain an open question for the present whether homologous factors may not have operated in the United States, leading either to the elimination, probably in infancy, of certain descendants of immigrants who might have survived in their original homes, or to the survival of certain of those descendants who might have been eliminated, also probably in infancy, in their original homes.

At all events it seems that even a conservative statement on Boas' lines is considerably more than the evidence justifies, based as it is on averages of such complex mixtures as those which come under the heading of "Sicilians," "Bohemians," "Hebrews," and so on. We may thus, for the present, retain some confidence that such physical characters as cephalic form have some degree of permanency, and it is hoped that this paper may help to strengthen that view by giving grounds for a belief that certain types, without any intervening social or linguistic barrier for centuries, have apparently persisted side by side in very marked fashion in certain parts of Wales.

The notion of a fair degree of permanence of physical characters has already received some support from studies of heredity on modern lines. Hurst² has

¹ Von Luschan, F., *Journ. Roy. Anthropol. Inst.*, 1911, p. 221.

² Hurst, C. C., "Inheritance of Eye Colour in Man," *Proc. Roy. Soc., B*, 1908, p. 85.

brought forward reasonable evidence in favour of the view that eye colour is inherited according to the Mendelian fashion. Dr. Brownlee¹ has worked out mathematical analyses of some of Dr. Beddoe's tables and has given some evidence for the view that the distinctions, especially in pigmentation, which Dr. Beddoe drew, represent real differences, and that the distributions of these characters among country folk in a settled district, without bars to intermarriage such as differences of religion or speech, conforms very closely to that which would be the case if inheritance were according to the Mendelian formula. Mathematical analysis is so dependent upon the premises whence one starts that it would be unwise to emphasize this type of evidence, but it at least does tend in some measure towards strengthening Mr. Hurst's view. It may be said that certain component features of head form in many cases seem to segregate more or less in Mendelian fashion, but this is matter for a further investigation; we are on safer ground in saying that the children of parents of different head form very frequently show a fairly complete resemblance to one or other parent, *i.e.*, that head form is frequently inherited in a fairly pure fashion.

It will be seen from the foregoing that we have aimed at avoiding the dangers attending the averaging of quantities or characteristics which are not homologous, but that, in this effort, we have come into contact with the most difficult problem in race-analyses, namely that of strictly characterizing the various types. They have often been defined primarily as regards cephalic index and pigmentation, and these and other characters are to some extent linked. This linkage is a subject for considerable investigation, but it is *a priori* unlikely that all the characters of an individual are so linked that it is possible for a man to be of "pure breed" throughout. Moreover the various breeds, be they never so clearly and completely defined, are undoubtedly differentiations from a not-so-very-remote common ancestral stock; they may not be more than sub-varieties in the biological sense. The presumption is thus that intermediate types may be either the result of intermixture or the consequence of a still uncompleted differentiation from a common ancestry. Considering, therefore, the grave inherent difficulties of the subject, it is our wish to put conclusions forward very tentatively and to state very frankly that methods of anthropological research must long be based upon the principle of choosing the lesser evil.

The dangers of the study of averages for selected districts have been set forth in such a way as to show the small value of averages unless we are sure of the, for our purposes, close homology of the matters averaged—and, in deciding race-characters, that homology must be close indeed, as we are dealing with what, at their highest, are barely varietal differences.

Another danger is, however, quite as great. The district selected may include several non-homologous parts, that is parts which have populations of different type and origin and homologies here change continuously with the changing

¹ Brownlee, J., *Journ. Roy. Anthropol. Inst.*, 1911, p. 179.

circumstances of changing periods. Thus two villages which seem strictly comparable now may have been widely distinct in times past: one may have been a station on a pilgrim-way and the other an isolated hamlet of agriculturists; one may have been habitable before the forests were cleared, the other not.

It has frequently happened that county averages have been given, and reflection will show how multiple the types and minglings of environment within such an area may be. Cardiganshire includes a high moorland, once perhaps occupied by forest, a lower moorland kept partially clear of trees by the westerly breezes, shepherds' hamlets, agricultural villages, market towns and finally seaside resorts. The upper moorlands are remote from railways and even from reasonable roads, the lower moorlands are full of the remains and the memories of prehistoric time, the seaside resorts hide a small mediæval nucleus in the centre of a boarding-house system, which has but the most casual relation to the rural population. A general statement about such a county is therefore weakened, as the diversity of types massed together will doubtless not permit the adequate expression of the distinguishing features of the real constituent elements. And yet a quiet rural county like Cardiganshire is probably unusually homogeneous, so the difficulties elsewhere will often be greater. In attempting to find a better way, however, we are faced with the same obstacles as before. We have grave difficulty in making reasonably sure of distinctive types of environment and it may be difficult even after careful geographical and archæological study to be assured of the homology of environments.

On every ground, therefore, we have reason to deal with individuals as far as possible, and to use averages only very restrainedly and for very carefully considered areas and groups.

In our work we have had in mind the criticisms urged by Flinders Petrie¹ and by Ridgeway² against physical anthropology. Both believe that type varies with environment and circumstance, and it would be interesting to go over the whole discussion point by point were it sufficiently profitable. It seems, however, that Flinders Petrie has in mind the method of averages as it has usually been employed, and with strictures upon the value of its conclusions we must confess to some sympathy. At the same time we should not venture to lay so much stress on the importance of migrations in substituting one population for another as Petrie seems inclined to do. Indeed, our work, so far as it goes, seems to indicate a remarkable persistence of type, a persistence so definite that, without the modern Mendelian hypotheses about heredity, there would be difficulty in accepting it as a fact. Ridgeway's views do not help one to understand such populations as our Welsh ones, where a rural district may have been exporting, and not importing, men for centuries and may yet show very marked diversities of type in a mixed population for explaining which no effective differences of environment can be postulated.

¹ Flinders Petrie, W. M., "Migrations," Huxley Lecture, 1906, *Journ. Roy. Anthropol. Inst.*, vol. xxxvi, 1906, p. 189.

² Ridgeway, W., "The Application of Zoological Laws to Man," *Report British Association* (Section H), 1908, p. 832.

THE GENESIS OF THE RESEARCH.

It is a matter of common remark among Welshmen that one can "tell" a man from such and such a district anywhere, and such remarks are true in a greater degree in Wales than in most parts of England, for it is certainly possible to do a great deal of identification without having recourse to distinctions of voice, intonation or speech. We have repeatedly identified people at sight as coming from Newcastle Emlyn, Llandyssul, Tregaron, the coal valleys of Glamorgan, the great cleft of Merionethshire and so on. There is therefore little doubt that something like "local types" still survive in Wales, though it must not be expected that all, even of the old residents, will approach that type in any case. Further, these local types are very markedly contrasted one with another, and, as will be shown in the sequel, approximate to various race types identified by anthropologists for Europe and traced by archaeologists in ancient interments. There is thus a presumption that in Wales, as a country comparatively little affected by modern movements of people save in certain well-marked districts, we find persisting in various parts types of mankind whose distinctions are not transient and accidental but rather date from a very remote past, and should be of use in elucidating the history of settlement. Incidentally it may be remarked that if such distinct types persist, often side by side, in Wales, and if they have persisted in some cases for hundreds of years or even longer periods, we have a case which is, to say the least, in most marked contrast with that of the immigrants into the United States of America as stated by Boas.¹ There can be little doubt that, even in Wales, local distinctions are weakening fast under the unifying influence of the railways and the levelling efforts of the Board of Education, and anthropological research in the country thus represents an attempt to secure vanishing data. Under the circumstances an effort has been made to assure the retention of the data as well as the results. The facts collected for each individual are registered together on a card which offers a permanent record of many details, in the hope that they may be available for re-analysis,² if that should be deemed desirable in the future.

It was decided to measure anyone and everyone who was of purely Welsh descent so far as known, to concentrate upon the simpler folk, as the more leisured classes are nearly everywhere of very mixed descent, and especially to avoid any tendency to select individuals for any reason whatsoever.

Perhaps there was at first some inclination to accept as inevitable the common doctrine of westward waves of migration of peoples each more or less displacing previous ones, but as it became evident that such a hypothesis was not in any kind of relation to the results attained, save in a very broad fashion and to a very slight extent, it was soon given up, and some years were spent in the collection and

¹ Boas, F., *Changes in Bodily Form of Descendants of Immigrants*, New York, 1912.

² We hope to be able to place copies of all our cards both in the National Library of Wales at Aberystwyth and in the collections at the Royal Anthropological Institute in due course.

analysis of data before any theory of distribution was found. We, therefore, feel safe from the danger of being among those who find what they set out to find. A hypothesis,¹ which opened up possibilities of reasonable interpretation that have grown in several directions, was developed only after five years of work, and arose out of an endeavour to reconstruct primitive conditions in a neighbourhood, with a view to appreciating some archaeological peculiarities noticed in geographical study. The fact is that this clue and another were found not because they were imagined and then looked for, but because every possible related line of inquiry was pursued in the hope of obtaining new light.

THE OBSERVATIONS TAKEN AND OTHER DETAILS OF METHOD.

The Committee of the British Association on anthropometric investigation in the British Isles issued its final report in 1908, when our work had already been organized for some time, but we had the advantage of consulting Dr. A. C. Haddon before beginning the work in 1905, and we were thus able to work to a considerable extent on lines suggested in that report. Our debt to Dr. Haddon for advice and encouragement is a very deep one, but we must claim full responsibility for any errors or shortcomings in method and in the selection of observations to be taken.

The Committee's scheme is a very exhaustive one, and is, of course, not by any means adapted to be carried out on the large number of individuals which must be studied for purposes of research into race history. We have, therefore, gradually selected a number of points as follows for adults:—

Name and address.

Sex and age.

Details of location and, if possible, family history of grandparents.

{ Mother's side. }
 { Father's side. }

The family history is a matter of proud tradition in rural Wales, and we were thus able to gain useful information which helped us to avoid putting recent immigrants or chance inhabitants among the supposed settled and old-established population of any given neighbourhood. Communications have improved only so very recently in rural Wales that in very many cases we found that the four grandparents of a villager belonged to a district of a few miles radius; dialect barriers and other factors have no doubt contributed to this result. We have thus not come too late to find traces at least of old-established and almost untouched populations, and we have ground for expectation that the distributions noted may be of quite long standing. The individuals described for a locality will be likely to be, as it were, concentrated essences of that locality. As there has been no movement of immigration on a large scale, save on the coalfield, for a long time, a

¹ Fleure, H. J., "Welsh Archaeology and Anthropology," *Arch. Camb.*, 1913, p. 153.

type found to be characteristic of a district is likely to be an old-established fact, especially if anthropological analyses and local opinion agree, as they often do. When it is found possible to correlate these types with ancient types described from skeletons the presumption of a long-continued persistence of a type is greatly strengthened.

Next to the above facts are noted some general characters for the observer's guidance:—

Skin, to be described as pale, sallow, dark, fresh, florid, with note on freckling.

Eye, described according to Professor Martin's "Augenfarbentafeln." Care is taken to discriminate between blues and greys, and to separate dark blue from the browns. Mr. C. C. Hurst's¹ observations of eyes have been prominently before us for some years.

Hair quantity, scarce, medium, abundant.

Hair colour, black, dark brown, medium brown, light brown, fair, auburn, fair red, dark red.

Face shape, long oval, broad oval, squarish, wedge-shaped. Notes on smoothness or fineness of feature.

Shape of nose, numbered from a chart specially drawn out.

Lips, thin, medium, thick.

Ear, size and form, whether lobule present, and if so whether laterally attached or not.

Head contour.

We have found such characters as dark skin, glossy black hair, prominent arched nose and so on of great interest in the course of the work.

The following measurements are taken, all in millimetres:—

Head length, maximum glabellar-occipital length.

Head breadth (maximum).

Bizygomatic breadth (maximum between corresponding points on opposite zygomatic arches).

Bigonal breadth (maximum between corresponding points on posterior angles of lower jaws).

Auriculo-nasal radius (to nasion).

Auriculo-alveolar radius.

Maximum head circumference.

Standing height.

Length of arm, from point of shoulder to tip of middle finger.

Length of leg, from top of upper edge of great trochanter.

This is a selection found by experience to give data useful for discrimination among the types in the district studied, and though it has not been found possible

¹ Hurst, C. C., *op. cit.*

to cut out any of the above it should be stated as a guide to other workers that the list is too long for use in a really extended survey. It is difficult to get people to consent to the taking of so many details and, in our case, the effort has been extended to approximately 2,500 individuals. The card records the observer's initial, date of observation, the place of observation, and any details of the family history of pigmentation the subject may be able to give.

It has been our custom for one of us to take the family history and descriptive points while the other took the head measurements, a helper sometimes taking the stature and limb measurements. In two districts considerable help was received from friends, Mr. Ll. T. Jones, B.Sc. (at Tregaron), and Mr. John Thomas, B.Sc. (at Harlech), but the measurements they took after getting experience with us, are registered in their names. Our friend, Mr. J. H. Shaxby, also gave us considerable help.

The work was done frequently under difficult conditions, and it was specially necessary to avoid unnecessarily complex instruments. We have therefore designed and used callipers provided with rods which could slide, and the instrument was thus used to take the radial measurements as well as the others. There can be no doubt about the importance of these radial measurements, and it is one of our chief regrets that we had to limit ourselves to two. *Notes and Queries on Anthropology*¹ refers, not without reason, to the difficulty of getting these measurements satisfactorily done.

Space is left on the card for cephalic index, but no statement as to "race type" or any other inferential matter was allowed, as it was a fundamental principle to try to avoid such forms of argument in a circle as would have been involved, had cards labelled in that way been utilized for study in race analyses and race character. Particular stress is laid upon the facts that by our method a person's characteristics were all permanently recorded on one and the same card, thus enabling us to analyse and re-analyse individuals as well as characters. Also, having the family history in some degree, we were able to place a card in the district to which it belonged by descent rather than by possibly temporary sojourn. Of course the value of this precaution is not so great as it might be if family history were better known, but it is probably permissible to suppose that there was less movement of population and less interregional mixture in rural Wales two generations ago than there has been since railways and education became important factors. Our endeavour was to measure all adults not too old to show the characters without decadence. No selection was attempted, save that persons with known foreign blood were avoided, unless it happened to be a case of people in the counties of England bordering Wales, and then the fact was specially registered. Cases of obvious deficiency or deformity were of course avoided or discarded. The difficulty of getting accurate measurements of women under our conditions of work has led to the number of women measured being somewhat small, but probably less

¹ *Notes and Queries on Anthropology*, fourth edition, 1912, p. 9.

is known of racial type amongst women and it is hoped to study this question independently later. The arguments in the present paper are from measurements of men between about 19 and 65 years of age, save where the contrary is stated.

The above inquiries as to family history are, we think, a fairly new point in anthropological work on this scale; most previous workers seem to have been satisfied to take residents, and in some cases little was done to avoid getting chance visitors included. This raises the question of the numbers necessary for justifiable conclusions, and we have to point out here that Dr. Beddoe's¹ series for South Wales included 66 individuals, though he says that this permits but scanty inferences. Indeed, he says little more than that the average cephalic index is 78. From more detailed observation of 16 cases he infers with less certainty a broad forehead, a small glabella, a somewhat low head, a somewhat short face, and a considerable lateral development of the zygoma. The total number measured for South England (including Gloucestershire) by Dr. Beddoe was just under 550, together with a few classed as educated Englishmen without statement of their place of origin or residence. The numbers for the other districts touched were mostly quite small. It is thus seen that the facts of this principal authority rest on what seems a slender basis, but it should be remembered that, in Dr. Beddoe's case, the measurements were largely a supplement to an acute general observation of physical type, strangely accompanied, as his remarks frequently show, by misapprehension in matters of psychical inference.

Analysis of Observations.

It is in reference to the analysis of observations that our methods have become most differentiated. At first, curves of cephalic indices and so forth were plotted in the accepted fashion, but it was found that our population was too mixed for this to have much real value. Sometimes the number of the long-headed people in a district was sufficient to give that curve a very distinct form, but, frequently, there were fair dolichocephals as well as dark ones, and a curve of cephalic indices became confused unless it were constructed for either fairs or darks as the case might be. If, however, that were done, then the problem was to decide the limits of fairness or darkness, and the form of the curve depended on the limits chosen.

Thus there was grave risk of argument in a circle, the besetting danger of anthropometrical research. The danger was increased by the fact that our method of analysis at that time necessitated choice of boundaries for the districts taken; this proved difficult and dangerous, since the determination of limits of areas possessing characteristic types was one chief point at issue.

Gradually, therefore, in order to avoid these dangers a plan was evolved of mapping people, individual by individual, on a large scale map. The individuals were designated by letters selected according to the accompanying table, so that

¹ Beddoe, J., *Races of Britain*, 1885, p. 231.

one composite mark described several important characters of the individual mapped. (Figs. 1 and 2 and Table 1, p. 51.)

L would thus represent a tall, roman nosed, fair haired, blue eyed adult man of cephalic index between 81 and 82.

{b would represent a short, black haired, brown eyed, prognathous person of cephalic index between 73 and 74.

The number of permutations and combinations of which this type of registration is capable makes it very useful for dealing with very finely graded forms such as are human individuals in a civilized country. The individual was registered on a map only if all four grandparents came from one sufficiently restricted area, say a radius of 12 to 15 miles about some spot, and thus the numbers put on the maps were not very large, but each mark on the map meant a good deal. Of course it is difficult to choose exactly the right spot for entering the register on the map in many cases, and the registration marks must therefore be interpreted in a broad sense as far as distribution is concerned.

It will be noticed that this method has several advantages:—

- (1) It permits us to study the distribution of any one physical character, *e.g.*, "Roman" noses, black hair, and so on.
- (2) It permits us to study the correlation of the selected character with others registered.
- (3) It retains the grouping of characters in each individual and permits us to study individuals.
- (4) It in no way prejudices questions of type as would be the case if the individuals were simply registered according to "types" inferred from our work or from accepted anthropological theory.
- (5) If the maps are considered broadly there is likewise no prejudgment of the distribution question, but care must be exercised to avoid narrow interpretations and sharp delimitations in this connection.

Our map registers, constructed as above, have enabled us to verify facts of occurrence of local types and, from the study of the map, it has been possible to turn back to the card corresponding to each registration mark in a district, and thus to compare afresh in all details taken the various individuals studied in a district, with a view to sorting out the various strains as far as possible. In no case has there been selection of individuals on any grounds save those mentioned here, *viz.*:—

- (a) Of ascertained parentage and ancestry as far as possible.
- (b) Of mental health and of freedom from deformity.
- (c) Of approach to maturity and absence of senility.

Our "local types" are studied especially in relation to more or less natural regions so far as the life of the people is concerned. We have tried to avoid grouping together, for example, hill shepherds and fisher folk, as would have been likely had we accepted administrative units. The recognition of these smaller

natural districts or regions has involved prolonged and intensive geographical study, and we have applied this mainly to the counties of Cardigan and Merioneth, but our studies have extended to other counties, as will appear in the sequel.

In these two counties we are able to study moorlands, deep valleys between hill ridges, coastal fringes, long lines of through-communication, and many other natural divisions of the country, and these two counties are in a very special sense the most Welsh of all, so that we may expect to find less admixture of English influence and types here. Carnarvonshire, in virtue of the relations of its two chief towns and also of the existence of the great through-routes between the mountains, does not seem to us to show the same apartness from English and other influences of comparatively recent date.

We have disregarded the political boundaries of the counties in order to discuss districts which are vital units. Thus the boundary between Cardiganshire and its southern neighbours for a considerable distance is the River Teifi, on which stand the little market towns of Llandyssul and Newcastle Emlyn, as well as smaller villages. The boundary is doubtless a reminiscence of the days when the valleys were almost uninhabited because they were filled with woodland and man was living on the moorlands above. This will have to be discussed at a later stage, but it is pointed out here as showing that lines of separation at one period may be lines of intercourse at another, and that it is obviously necessary to avoid artificialities in assigning limits. Our limits, thanks to the map registration method, can be revised at any time if newer knowledge makes this desirable, and this facility of revision, we claim, is characteristic of all our work. We feel that permanent record of actual facts for each individual, and treatment with a view to future revision at every stage, is the only way in which work such as ours, on vanishing data very difficult to collect and still more difficult to classify, can be workably organized.

It expresses, further, the tentativeness of all our conclusions and our frank and unreserved admission of the difficulties of a satisfactory identification of types.

Our tables are to be looked upon as extracts from our cards, and the same individual may appear on more than one district-table if he belongs to some place which it is difficult to allocate to one district or another definitely.

After ten years of work it has become possible to describe a man broadly at sight and without his being aware of it. It has therefore been proposed to supplement the present study of types by a much more extended survey of distributions, to go everywhere and fill up observation cards of all the men and all the women seen in each village or hamlet. Cards for this purpose include about eighteen columns representing various combinations of cephalic index and pigmentations. Each individual is registered as S., M. or T. according to whether the stature is short, medium or tall. With this scheme it will not be possible to ascertain a man's ancestry, but the visiting of the villages at times when strangers are not likely to be about, coupled with the fact of the large numbers taken, is a compensation. Our older method of accurate measurement does not lend itself to distributional study in detail save with measurements carried out universally by a

large staff of paid and trained workers. The new method has already proved its value, and its results, checked by measurements where necessary and possible, will be the subject of a further paper. The present paper is an effort to ascertain types and certain of the broader facts of their distributions, supplementing this by inquiries into geographical, historical and archæological correlations which help to give meaning to the distributions noted.

It will be convenient to have at the outset a general table showing cephalic index and pigmentation (Table 2, p. 52) of adult men measured, and a similar table of women (Table 3, p. 53). We do not propose to discuss these general tables in detail, but think them useful for showing frequencies of such characters as red hair, black hair, long heads, etc., thus enabling us to judge by comparison whether any of these is specially noteworthy in a district studied in detail. The tables deal with 1852 men and 344 women.

It will be noticed firstly that the women seem broader-headed than the men, as is best seen by placing side by side the percentages of men and of women having cephalic indices of certain values.

	Percentages.	
	Men.	Women.
Under 73	<u>2·7</u>	1·4
73 to 73·9	<u>3·2</u>	1·7
74 to 74·9	<u>7·3</u>	2·6
75 to 75·9	<u>11·2</u>	7·3
76 to 76·9	<u>12·3</u>	11·6
77 to 77·9	<u>13·2</u>	11·9
78 to 78·9	<u>12·7</u>	10·5
79 to 79·9	<u>13·2</u>	9·0
80 to 80·9	9·8	<u>13·1</u>
81 to 81·9	5·9	<u>11·6</u>
82 to 82·9	3·8	<u>7·3</u>
83 to 83·9	2·7	<u>5·2</u>
84 and over	1·9	<u>6·7</u>
Total number of cases	1852	344

These figures are rather striking and the excesses show such a regular gradation that the differences cannot be due to irregularities arising from small numbers. The larger percentage in each case is underlined, and the underlining is double if the ratio is greater than 3:2. It will be seen that the excess of men with indices under 76 is considerable (24·45 per cent. against 13·08 per cent.), while that of women with indices above 80·9 is equally striking (30·81 per cent. against 14·36 per cent.). This we do not ascribe in the main to any difference of racial elements on a large scale between the two sexes. If there were a difference, it would be fair to suppose that it had arisen through the intermarriage of newcomers with aboriginal women, though one could not claim that this would lead the present population to show an older type in its women. A slightly more marked inheritance of fundamental type in women is a more or less accepted biological inference, and it is unquestioned that the fundamental type in Britain is the narrow-headed one (in the male at all events). We therefore incline rather to the view that the difference, especially in view of its regular gradation, is principally a sex-difference. It is of great importance to bear this difference in mind in observation work.

The pigmentation differences between the two sexes should also be noted:—

	Percentages.	
	Men.	Women.
Hair light, eye brown	3·5	2·6
Hair red, any eye	7·1	5·3
Hair light, eye light (including all blues) ...	20·5	20·9
Hair dark, eye light	28·8	26·7
Hair dark (including black), eye dark ...	40·1	44·5

We notice here chiefly that among women, dark eyes and dark hair are more often associated together than is the case among men, *i.e.*, there is a tendency to a more marked inheritance of pigmentation, or a more complete inheritance of it, perhaps, among women. We have since found that Beddoe¹ noticed this.

The proportion of men who have dark hair and dark brown eyes and head index over 80·9 is about 14·5 per cent. of all the dark men, while the corresponding percentage among women is 34 almost exactly.

The proportion of men who have dark hair and dark brown eyes and head index over 80·9 is about 40·6 per cent. of all the men with head index over 80·9,

¹ Beddoe, J., *Anthropological History of Europe*, 1912 ed., p. 98.

and the proportion of men who have dark hair and eyes is about 40·1 per cent. of the total, *i.e.*, the broad-headed men do not incline to dark colouring appreciably more, or less, than those with longer head. In the case of the women the first percentage is 49·1, the second 44·5. This means that pigmentation is somewhat more marked among the broader-headed women. So far as could be ascertained, the contrasts in measurements between the two sexes were not due to any extent to differences as regards the places where large numbers of men and of women, respectively, were measured. The conclusion is thus almost inevitable that there is an important sex-difference in the colour and head-form in the Welsh population, and with this note we leave the subject for a future discussion in more detail.

Northern
District

Central
District

Southern
District

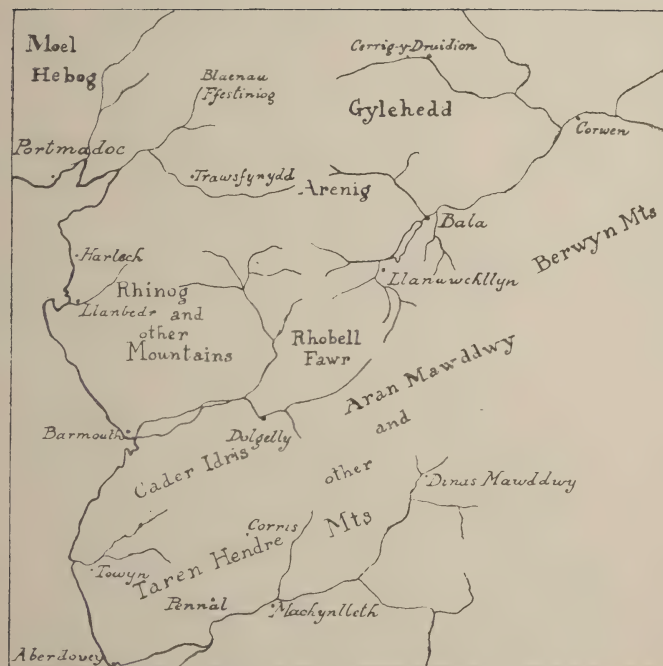
Physical Features shown thus: Borth Bog:

© *For explanatory Legend* ©
- see Map of -
Merionethshire.

Scale of Miles

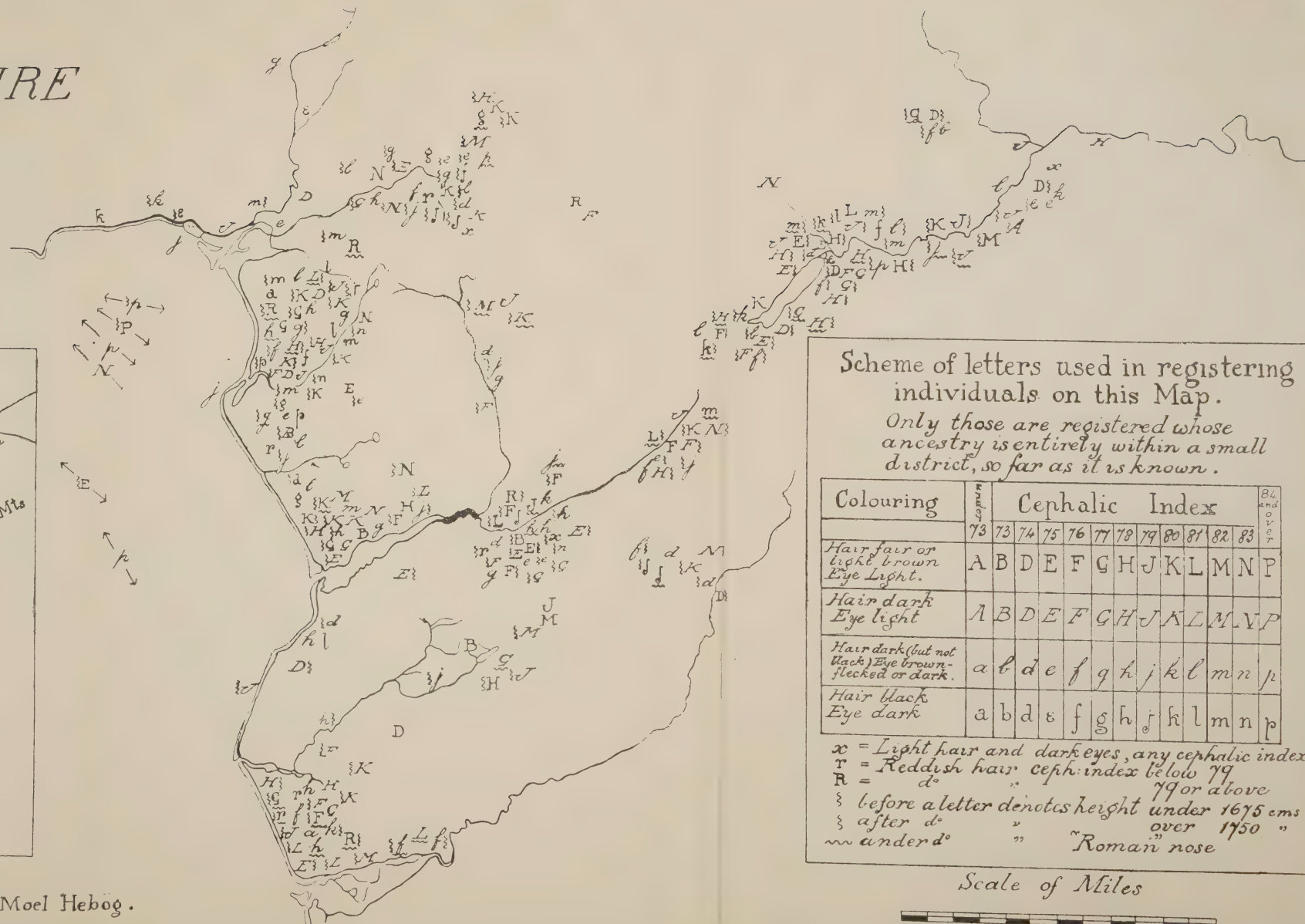


MERIONETHSHIRE



Key to Large Map.

Mountains shown thus: Moel Hebog.



Scheme of letters used in registering individuals on this Map.

Only those are registered whose ancestry is entirely within a small district, so far as it is known.

Colouring	Cephalic Index	BL and over
	73 74 75 76 77 78 79 80 81 82 83	
Hair fair or light brown Eye light.	A B D E F G H J K L M N P	
Hair dark Eye light	A B D E F G H J K L M N P	
Hair dark (but not black) Eye brown-flecked or dark.	a b d e f g h j k l m n p	
Hair black Eye dark	a b d e f g h j k l m n p	

x = Light hair and dark eyes, any cephalic index
 r = Reddish hair cephalic index below 79
 R = " " " " 79 or above
 } before a letter denotes height under 1675 cms
 } after " " " " over 1750 "
 ~ under " " " " Roman nose

Scale of Miles



TABLE 1.—SCHEME OF LETTERS USED IN REGISTERING INDIVIDUALS ON THE MAPS HEREWITH.

NOTE.—The numbers used to denote Eye Colour are those of Professor Martin's Augenfarbentafeln.

PIGMENTATION.	CEPHALIC INDEX. ¹												
	Under 73	73	74	75	76	77	78	79	80	81	82	83	84 and over.
Hair light, eye dark (darker than 10) ...	x	r	x	x	x	x	x	x	x	x	x	x	x
Hair red ...	r	B	r	r	r	r	r	R	R	R	R	R	R
Hair fair or light brown, eye light ...	A	B	D	E	F	G	H	J	K	L	M	N	P
Hair dark, eye light (lighter than 10) ...	A	B	D	E	F	G	H	J	K	L	M	N	P
Hair dark (but not black), eye dark (10 or darker) ...	a	b	d	e	f	g	h	j	k	l	m	n	p
Hair black, eye dark ...	a	b	d	e	f	g	h	j	k	l	m	n	p

¹ We used the Glabello-Maximal Length, and this should be borne in mind in connection with any comparison between our figures and those obtained when the Ophryo-Maximal Length is used. Probably one might allow a difference of rather less than one unit in the cephalic index, the figures if the Ophryo-Maximal is used being that one unit higher.

TABLE 2.—ADULT MEN—WALES.

NOTE.—The numbers used to denote Eye Colour are those of Professor Martin's Augenfarbentafeln.

PIGMENTATION.	CEPHALIC INDEX. ¹													Per- cent- ages.
	Under 73	73	74	75	76	77	78	79	80	81	82	83	84 and over.	Total.
Hair light, eye dark (darker than 10) ...	1	2	6	5	9	10	5	6	11	5	2	2	1	65
Hair red ...	3	4	7	19	16	8	21	19	12	10	8	2	3	132
Hair fair or light brown, eye light ...	6	7	24	38	54	58	41	55	38	23	14	17	4	379
Hair dark, eye light (lighter than 10) ...	10	19	34	5	67	76	74	73	54	29	17	13	8	533
Hair dark (but not black), eye dark (10 or darker) ...	23	20	47	63	61	68	74	71	42	33	22	13	14	551
Hair black, eye dark ...	8	8	17	23	21	25	20	20	24	10	7	3	6	192
Along this line are given numbers of individuals for each cephalic index ...	51	60	135	207	228	245	235	244	181	110	70	50	36	1852
Percentages ...	2·75	3·24	7·29	11·17	12·31	13·23	12·69	13·18	9·77	5·94	3·78	2·7	1·94	

¹ We used the Glabello-Maximal Length, and this should be borne in mind in connection with any comparison between our figures and those obtained when the Ophryo-Maximal Length is used. Probably one might allow a difference of rather less than one unit in the cephalic index, the figures if the Ophryo-Maximal is used being that one unit higher.

TABLE 3.—ADULT WOMEN—WALES.

NOTE.—The numbers used to denote Eye Colour are those of Professor Martin's Augenfarbentafeln.

PIGMENTATION.	CEPHALIC INDEX. ¹													Per-cent-ages.
	Under 73	73	74	75	76	77	78	79	80	81	82	83	84 and over.	Total.
Hair light, eye dark (darker than 10) ...	1	0	0	1	2	0	0	2	0	1	0	0	2	9
Hair red	0	0	0	1	0	3	4	3	2	2	2	1	0	18
Hair fair or light brown, eye light ...	1	0	0	7	13	3	10	7	15	5	5	4	2	72
Hair dark, eye light (lighter than 10) ...	3	4	3	8	7	14	6	8	9	13	8	4	5	92
Hair dark (but not black), eye dark (10 or darker)	0	1	6	6	16	18	14	9	17	15	8	7	13	130
Hair black, eye dark	0	1	0	2	2	3	2	2	2	4	2	2	1	23
Along this line are given numbers of individuals for each cephalic index ...	5	6	9	25	40	41	36	31	45	40	25	18	23	344
Percentages	1.45	1.74	2.62	7.27	11.63	11.91	10.47	9.01	13.08	11.63	7.27	5.23	6.68	

¹ We used the Glabello-Maximal Length, and this should be borne in mind in connection with any comparison between our figures and those obtained when the Ophryo-Maximal Length is used. Probably one might allow a difference of rather less than one unit in the cephalic index, the figures if the Ophryo-Maximal is used being that one unit higher.

Figs. 3-5.—Tentative Interpretations of the Map Registers (Figs. 1 and 2).

The figures on these maps give the percentage of the local sample which belongs to a certain group.

These small maps should be studied only in connection with Figs. 1 and 2.



FIG. 3.—PERCENTAGES OF NARROW-HEADED DARK TYPES (a-h or a-h ON MAP-REGISTERS).

The figures are written large when the local sample is a comparatively large one.



FIG. 4.—PERCENTAGES OF BROAD-HEADED DARK TYPES (l-p or l-p on MAP-REGISTERS).

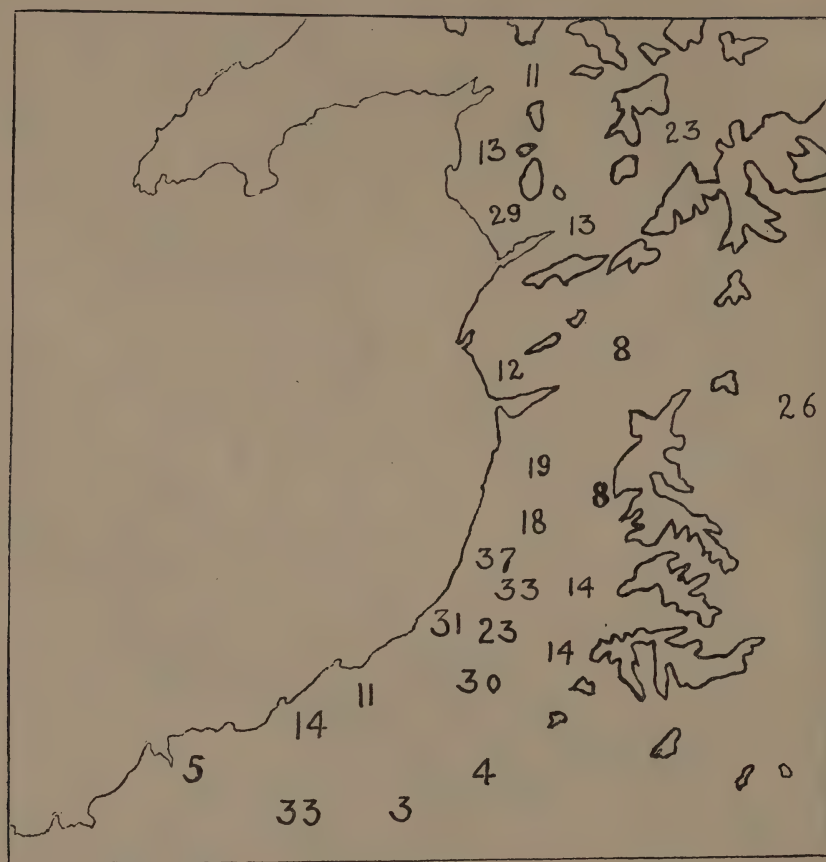


FIG. 5.—PERCENTAGES OF FAIR TYPES.

CARDIGANSHIRE (Figs. 1 and 3-5).

Analyses of Measurements from Plynlymon District.

The Plynlymon Moorlands are such a characteristic district and the results from this district present such interest that it seems well to begin our analyses here.

TABLE 4.—PLYNLYMON MOORLAND.

Adult men, in order of ascending cephalic indices.

(Letters on Fig. 1 enclosed by broken line.)

No.	Age.	Head length.	Head breadth.	Index.	Auric nasal radius.	Auric alveolar radius.	Hair colour.	Eye colour.	Stature.	Map letter. (See Table 1, p. 51.)
1	60	214*	152	71·0	95	97+	dark brown	dark brown	1675	a
2	25	208*	149	71·6	Prognathoust		dark brown	brown	1710	a
3	40	206*	149	72·3	97	100+	black	brown	1685	a
4	35	203*	148	72·9	87	89+	dark brown	dark brown	1690	a
5	56	204	149	73·0	93	96+	red brown	blue	1710	r
6	ad.	203	149	73·4	89	87	dark brown	blue	1650	B
7	30	199*	147	73·8	85	92+	black	grey brown flecked	1715	b
8	ad.	192*	142	74·0	95	94	medium brown	grey brown flecked	1560	d
9	30	200	148	74·0	94	95+	dark brown	grey brown flecked	1675	d
10	29	191	144	75·4	—	—	black	brown	1650	e
11	20	199	150	75·4	93	96+	red	blue	1700	r
12	20	201	152	75·6	—	—	red	brown	1770	r
13	50	191	145	75·9	95	101+	fair auburn	grey brown	1595	r
14	35	194	149	76·1	97	92	red	brown	1650	r
15	50	207	158	76·3	105	102	dark brown to black	dark brown	1750	f (not entered on map)
16	55	205	157	76·6	110	108	dark brown (beard red)	blue	1780	F
17	20	179	138	77·1	82	81	medium brown	dark brown	1725	g
18	24	197	152	77·2	—	—	medium brown	grey blue	1670	G
19	30	197	152	77·2	89	88	dark brown	brown	1700	g
20	25	199	154	77·4	105	100	dark brown	medium	1755	g
21	31	205	161	78·0	—	—	auburn	blue	1715	r
22	22	198	155	78·3	95	90	light	blue	1730	H
23	23	195	148	78·5	—	—	medium brown	brown	1680	h
24	33	203	161	79·3	—	—	black	brown	1665	j
25	59	200	160	80·0	105	103	fair red	blue	1600	R
26	60	191	158	82·7	94	94	light brown	blue	1600	M
27	40	194	161	83·0	80	85+	black	medium	1800	n

In the above list :—

* indicates prominent glabella and a low, receding forehead, accompanying strongly marked occiput.

† indicates prognathism.

NOTES.—Numbers 3 and 4 are brothers.

Numbers 20 and 22 are brothers and are sons of number 16.

The inclusion of close relations in the above fashion is not found except in this table, and is here excusable, as it is so difficult to obtain numbers of men on this sparsely peopled moorland.

The country is in the main a portion of the high plateau which includes a large part of the surface of Mid-Wales ; at Pen Plynlymon Fawr it rises to 2468 feet, and the region above 2000 feet is, as is usual in Wales, considerably dissected, with a glacial cirque beneath the summit of the mountain. Elsewhere the country would be a rolling moorland, with great valleys, it is true, if it were not that certain of its streams have been captured by the torrent drainage of its sharp western edge eight miles inland from the coast of Cardigan Bay. These captured streams make their way through the plateau edge in deep gorges with naturally wooded sides, and the conditions are therefore such as to have hampered communications very considerably before the valleys were cleared. This is all the more important as the torrents have eaten their way back right into the heart of this moorland, which is thus cut by deep gorges. Its western edge (about 1000 feet) is higher than the general level a little farther east (900 feet) and the slope down its edge is often very steep until a lower plateau (usually 500–800 feet) is reached. This lower or coastal plateau is a great feature of west and south-west Wales ; it is much cut up by streams and it approaches the sea in cliffs or hills, isolated by dissection, that are often 400 feet high. The high plateau and the coastal plateau are therefore somewhat distinct physically and the difference of conditions and difficulties of intercommunication have made them very separate in a human sense from ancient times onwards.

The upper plateau in the immediate vicinity of Plynlymon is almost destitute of roads, and its inhabitants are a few shepherds who cultivate a few of the more favoured spots. There are at present great stretches of peat bogs, but it is probable that much of the region was wooded until Tudor times, though the upper hillsides would usually be too wind-swept, even where they are not too high, for trees. The local stone includes some second-rate grits and various mudstones. It is thus evident that both from the point of view of physical circumstances (the small amount of land free from natural woodland save at great heights) and of that of materials for implements, the Plynlymon moorland was very inhospitable for early man. It would seem to have been a rather isolated refuge, and to this day it keeps itself separate from the life outside, save for the vicinity of the one through-road. In antiquity, while the people of the coast plateau would seem to have had

a good many flint implements from the beaches (glacial drift down the Irish Sea), the moorland folk, if we may judge from a few collections from hut sites, eked out the few coast flints they procured with many poor implements of local grit. A selection of these has been collected by Professor O. T. Jones and Mr. R. U. Sayce, on an ancient hut site near Llechwedd Mawr, Plynlymon, 1912; this is mentioned here by kind permission. The description of these grit objects as human implements is not a very assured one, but as a number of them was found on one and the same hut site, it is fairly probable.

On such a moorland it was difficult to get measurements of large numbers of individuals. The persons enumerated trace their ancestry back on the moorland so far as is known, and in some cases they are able to trace it back very far along several interweaving lines, all within the moorland.

The average cephalic index for these 27 cases is about 76·1 compared with about 78·0 for 1852 adult Welsh men. This lowness of average is due in part to the small number of broad heads and in part to the larger number of very long heads. The two people with really broad heads are very distinct from the rest and may be strays; one almost certainly is a stray, as will be explained later. Without them the average would be as low as 75·6.

On the other hand, as many as 9 out of the 27 have cephalic indices not above 74·0, that is 33 per cent., are extremely longheaded, for 74·0 on the head is 72·5 on the skull. The figures happen to be the same if we take 74·9 as our limit, and we note that for our 1850 cases from the whole of Wales, those with indices that are less than 74·9 form only 13·3 per cent. (against 33·3 per cent. here).

In order to follow this up, the facts on our cards relating to men with indices below 73, observed in any part of Wales, have been tabulated.

TABLE 5.

No.	Age.	Head length.	Head breadth.	Index.	Stature.	District.	Map letter.
1	adult	194	130	67·0	1600	Dyfi	a
2	20	201	135	67·1	1618	Glam.	A
3	38	207	144	69·6	1680	Abergele	A
4	45	212	148	69·8	1775	Llangwryfon	a
5	20	204	144	70·6	1686	N. Cent. Cardiganshire ...	A
6	24	189	134	70·7	1618	Llanidloes... ..	A
7	27	205	145	70·7	1675	Llanidloes... ..	a
8	19	205	145	70·7	1730	Moylgrove	a
9	27	199	141	70·8	1622	S. Carmarthenshire ...	a
10	60	203	144	70·9	1685	Merionethshire	A
11	60	214	152	71·0	1677	Plynlymon	a
12	50	215	153	71·2	1765	Llandyssul	A

TABLE 5.—*continued.*

No.	Age.	Head length.	Head breadth.	Index.	Stature.	District.	Map letter.
13	adult	204	146	71·6	1768	Denbigh and Flint ...	A
14	adult	208	149	71·6	1860	Denbighshire ...	A
15	25	208	149	71·6	1711	Plynlymon ...	a
16	26	198	142	71·7	1702	Clydey ...	a
17	41	202	145	71·8	1730	W. edge Plynlymon ...	a
18	47	196	141	71·9	1768	Denbighshire ...	a
19	19	196	141	71·9	1550	Mixed, Border ...	a
20	43	200	144	72·0	1775	W. edge Plynlymon ...	A
21	21	197	142	72·0	1645	Mixed S. Wales ...	a
22	adult	209	151	72·2	1715	Pembroke... ...	A
23	62	198	143	72·2	1645	Llandrillo ...	A
24	21	201	145	72·3	1695	Llanelly ...	a
25	22	191	138	72·3	1575	Mixed ...	r
26	40	206	149	72·3	1685	Plynlymon ...	a
27	adult	199	144	72·3	1605	Llanidloes... ...	a
28	40	199	144	72·3	1695	Bethesda ...	a
29	20	195	141	72·3	1735	Llanidloes... ...	A
30	22	185	134	72·4	1685	N. Glamorgan and Llanidloes.	a
31	adult	196	142	72·4	1785	Llanidloes... ...	a
32	adult	203	147	72·4	—	Llanelly ...	r
33	20	196	142	72·4	1600	St. Dogmaels ...	A
34	50	197	143	72·6	1670	Llandyssul ...	a
35	adult	209	152	72·7	1820	Abergele ...	a
36	adult	198	144	72·7	1690	Mixed ...	A
37	adult	206	150	72·8	1735	Merioneth coast ...	a
38	adult	202	147	72·8	1645	Caersws ...	a
39	adult	199	145	72·8	1725	Denbigh ...	a
40	21	202	147	72·8	1750	N. Cent. Cardiganshire ...	A
41	adult	192	140	72·9	1750	Merioneth coast ...	a
42	21	199	145	72·9	1720	N. Merioneth coast ...	a
43	35	203	148	72·9	1690	Plynlymon ...	a
44	adult	207	151	72·9	1740	Llangwryfon ...	a
45	adult	188	137	72·9	1695	Llandinam ...	a
46	31	196	143	72·9	1665	Carno ...	A

They number 46 in a survey of about 1850 adult men, *i.e.*, about 2·49 per cent. ; 28 of them are dark in hair and eyes, 2 are red, 10 have more or less dark hair but light eyes, and 6 only are fair.

Of the 28 darks, 4 belong to the Plynlymon moorland itself, 9 more belong to its borders, and one other is of mixed ancestry, partly from Plynlymon borders. In other words, about half of the whole number of dark narrow heads (below 73 C.I.) are connected with the Plynlymon district. Among the non-dark people, none belong to Plynlymon itself, while only 4 out of the 18 belong to its borders. Of these 4, 2 belong to Llanidloes and 1 to Carno, and it is quite certain that the influence of fair-type immigrants has penetrated steadily up the Severn valley towards the aboriginal fastnesses of Plynlymon.

It may be noted for discussion in a later section that 5 of these narrow-headed types come from the borders of the Denbighshire moorland; they all have more or less dark hair, but 3 have light eyes and 2 have dark eyes. It will be seen hereafter that that moorland is another centre for ancient types, though in a lesser degree and of a more mixed character than the Plynlymon and Llandyssul (*v. inf.*) districts.

There is thus abundant reason to suppose that, whatever the reason, the Plynlymon moorland is a nest of extreme dolichocephaly, which usually goes with dark colouring. In the most marked instances there is a noticeable platycephaly and the largeness of the measurements is noteworthy; it is due to prominence of both glabella and occiput. Six cases of marked platycephaly noted here are a considerable justification for this identification of a peculiar type. Thanks to the kindness of Dr. John Beddoe and Dr. A. C. Haddon we have had the advantage of getting copies of slides and photographs of Welshmen from the collection of the former. In this collection were portraits of two celebrities of forty or fifty years ago, one of whom was obviously of this type, while the other also had the type but with some traces of what may be called negroid character (hair of an unusually close curliness, prognathism very marked, and so on). These photographs were shown to Sir John Rhys, in the hope that he might be able to identify them and tell us to what district they belonged. He startled us by saying not only that they were brothers (Plate IV, 5, 6), but that they belonged by birth and ancestry to the western side of Plynlymon. The existence of this type is therefore no chance of the present day, but a feature doubtless of some antiquity in the neighbourhood. We shall venture to call it for the purposes of further argument *the Plynlymon variety* and to describe it by reference to Table 4, No. 1, and the photographs illustrating him (Plate I, 1A, 1B). Before discussing its homologies, reference must be made to another feature of the table. In the list of 27 cases there are 7 with more or less auburn or red hair, while one other is noted down as having a markedly red beard. 25·9 per cent., that is, have red hair, and this occurrence of red hair is a locally well-known fact about the moorland. All save one of these have a cephalic index above 75, and there can be little doubt not only that this type is something quite distinct from the one previously discussed, but that it is also something characteristic of the district.

The percentages of "Reds" (including auburn) in our tables are 7·3 for Wales (men), 5·3 for Wales (women), 7·4 for Cardiganshire, 3·7 for Merionethshire, 12·0

for Carmarthenshire, 9.0 for East Central Wales, 4.7 for Denbigh and Flint, and 7.9 for Carnarvon and Anglesey (men in each case). The percentage (25.9) in the Plynlymon district is thus very unusually high. It would be difficult at present to give an adequate explanation of this, but something which may be more than a coincidence may be suggested here. After the observations had been taken and the above table drawn up, one of us inquired of an archæologist whether there might be any record or tradition of the Gwylltiaid Cochion Mawddwy (the Red Robbers of Mawddwy) having taken refuge in this desolate moorland when they were dispersed in Tudor times. The reply was that this was a well-established fact known to students of local history. The Mawddwy brigands are known to have been red, and they may have left their physical inheritance in their place of refuge.

Applying an analogical argument from this case, and bearing in mind what has been said about the archæology of the district, we are inclined to think that the long-headed dark type, which is, as will be seen, the more prevalent type in Wales, is intermingled in this remote refuge with survivors of some older type. The strong development of the glabella and the low receding forehead suggest in a way the Neanderthaloid types, but Keith¹ is probably right in concluding that these are very distinct from the rest of humanity, perhaps even a distinct species.

One notices a possible far-off resemblance to the skulls from Brünn, Dartford, or Galley Hill. The measurements of these skulls would be, perhaps, not unlike those of our first individual (see Plynlymon list). 214 mm. length and 152 breadth, for example, may be taken, using Anderson's² measurements, as corresponding to about 205 and 142-3 on the skull.

The figures³ for the others are Brünn 206, 144, Dartford, 207, 150, Galley Hill, 204, 140, Clichy, 204, 138. The measurements are not unlike those of the Cro-Magnon type (203, 150), but the forehead seems very different.

One imagines that the Galley Hill man, if restored, would show nearly as much recession of the brow as do our Plynlymon types.

The Combé Capelle skull seems to approach our type as well. Most of these, however, are so ancient as to make any serious comparison inexpedient.

We note that Greenwell and Rolleston⁴ figure a skull with strong superciliary ridges, receding forehead, and long head from Langton Wold, but the measurements are rather small. The measurements for our Plynlymon variety are only rarely approached in Davis and Thurnam's⁵ lists in the *Crania Britannica*. Perhaps the Uley skull is the nearest approach among those figured, but the forehead, though

¹ Keith, A., *Antiquity of Man*, 1915, pp. 137-159.

² Anderson, J. H., "On the Relative Thickness of the Cranial Integuments," *Journ. Roy. Anthropol. Inst.*, 1910, p. 272.

³ Keith, A., *Antiquity of Man*, 1915, see p. 69, pp. 160-227; and pp. 137-144.

⁴ Greenwell, W., and Rolleston, G., *British Barrows*, 1877, p. 602.

⁵ Davis, J. B., and Thurnam, J., *Crania Britannica*, 1865, plate 5.

contracted and receding, as in our types, is not at all low. The chin is fairly indicated, as in our types, but the Uley skull does not appear to show much prognathism. The skull from Ledbury Hall (Derbyshire), described by Huxley,¹ has a general likeness to those of our types, but its measurements are smaller. The Borris skull (203 by 150), described by Huxley,¹ is perhaps nearest to our type and is neolithic and Irish. Borlase² notices a large number of cases of "mecistocephalous dolichocephalous platycephaly"³ from skulls and from observations of modern types here and there, and suggests Irish examples, but we think our record is the first mention of a "nest" of this type.

TABLE 6.—ANALYSIS OF MEASUREMENTS.

Llandyssul, Llanfihangel-ar-Arth, Llanwenog, Llan-y-byther, Pencarreg.

(The letters on the map (Fig. 1) are enclosed by a broken line.)

No.	Age.	Head length.	Head breadth.	Index.	Stature.	Map letter.
1	50	197	143	72·6	1670	<i>a</i>
2	20	190	139	73·2	1660	<i>x</i>
3	25	201	149	74·1	1745	<i>d</i>
4	46	203	151	74·3	1710	<i>d</i>
5	36	208	154	74·0	1645	<i>d</i>
6	41	214	159	74·3	—	<i>D</i>
7	33	198	148	74·7	1725	<i>D</i>
8	58	200	149	74·5	1620	<i>D</i>
9	52	200	150	75·0	1650	<i>E</i>
10	33	209	157	75·1	1655	<i>e</i>
11	42	206	155	75·2	1765	<i>e</i>
12	35	198	149	75·2	1700	<i>e</i>
13	28	204	155	75·9	1645	<i>e</i>
14	21	203	154	75·9	1705	<i>e</i>
15	57	195	148	75·9	1645	<i>E</i>
16	29	205	154	75·1	1665	<i>E</i>
17	62	185	140	75·7	1630	<i>E</i>
18	56	200	151	75·5	1780	<i>x</i>
19	41	209	159	76·1	1780	<i>f</i>
20	19	193	148	76·7	1665	<i>f</i>
21	21	202	154	76·2	1720	<i>f</i>
22	55	210	161	76·6	1785	<i>f</i>

¹ Laing, S., and Huxley, T. H., *Prehistoric Remains of Caithness*, 1866, p. 114, and pp. 125-6.

² Borlase, W. C., *Dolmens of Ireland*, 1896, p. 922.

³ This means a condition of extreme narrow-headed long-headedness combined with the possession of a low, receding brow.

TABLE 6.—ANALYSIS OF MEASUREMENTS.—*continued.*

No.	Age.	Head length.	Head breadth.	Index.	Stature.	Map letter.
23	54	193	148	76·7	1565	<i>f</i>
24	20	203	156	76·8	1730	<i>f</i>
25	23	196	150	76·5	1670	<i>F</i>
26	60	198	152	76·8	1600	<i>f</i>
27	59	196	150	76·5	1705	<i>r</i>
28	35	197	150	76·1	1670	<i>r</i>
29	adult	193	148	76·7	1715	<i>r</i>
30	56	195	149	76·4	1870	<i>x</i>
31	52	200	155	77·5	1675	<i>g</i>
32	61	197	152	77·2	1675	<i>g</i>
33	44	195	152	77·9	1630	<i>g</i>
34	39	206	159	77·1	1680	<i>g</i>
35	22	199	155	77·9	1670	<i>G</i>
36	47	199	155	77·9	1730	<i>G</i>
37	49	197	152	77·2	1650	<i>x</i>
38	22	198	156	78·8	1735	<i>h</i>
39	21	198	155	78·3	1775	<i>h</i>
40	48	188	148	78·7	1675	<i>h</i>
41	20	193	151	78·3	1665	<i>h</i>
42	24	193	153	78·3	1710	<i>H</i>
43	26	205	161	78·6	1660	<i>r</i>
44	22	201	158	78·6	1705	<i>x</i>
45	19	194	154	79·4	1725	<i>J</i>
46	19	192	153	79·7	1675	<i>J</i>
47	28	199	159	79·9	1725	<i>J</i>
48	63	198	157	79·3	1680	<i>j</i>
49	25	201	159	79·1	1755	<i>j</i>
50	30	191	153	80·0	1720	<i>K</i>
51	56	203	163	80·3	1665	<i>K</i>
52	25	189	152	80·4	1780	<i>k</i>
53	37	212	171	80·7	1750	<i>k</i>
54	19	193	157	81·3	1615	<i>l</i>
55	19	185	151	81·6	1710	<i>l</i>
56	43	198	163	82·3	1715	<i>m</i>
57	44	188	156	83·0	1635	<i>n</i>
58	21	181	152	84·0	1710	<i>p</i>

At an early stage in our work we saw that the Llandyssul district (South Cardiganshire) possessed numbers of dark dolichocephals. A conversation with a

local hatter in the small market-town brought out the fact that special shapes have to be ordered because of the projecting occiput very common in the district. 58 adult men who trace back their ancestry on both sides in the neighbourhood of Llandyssul and Llanwenog are enumerated. Their stature and head lengths and breadths, and letters denoting their colouring, are given in the accompanying table, extracted from our cards giving detailed information about each. It may be well to repeat that the number of persons measured here was much larger than 58, was much above 100 in fact, but 58 was the number of "concentrated samples," *i.e.*, of people who belong entirely to this district by ancestry two generations back at least.

Of these, it will be noticed that 33 are distinctly dark, while 14 have more or less dark hair but light eyes. Only 2 medium to broad headed men are pure fair, 5 have the anomalous combination of light hair and dark eyes, four are red.

The great scarcity of fair types is the most noteworthy fact. The next is that 24 of the above-mentioned 33 and 11 of the 14 have head indices below 79, *i.e.*, may be said to be distinctly dolichocephalic, for 79 on the head is 77.5 on the skull.¹

Llandyssul, etc., is thus distinctly a region for dark dolichocephals.

Comparing the table with that for Plynllymon, we note that here only 2 out of 58 have indices below 74, whereas in the Plynllymon case the number was 7 out of 27. In the Llandyssul case the projection of the glabella was not very noticeable, neither was platycephaly at all marked. The Plynllymon variety is thus seen to be a type slightly different from that characteristic of Llandyssul.

The following *résumé* of the cases of dark men on our table will be useful:—

Cephalic index.	Head length.
72-72.9	197
73-73.9	—
74-74.9	201, 203, 208
75-75.9	209, 206, 198, 204, 203
76-76.9	193, 202, 210, 193, 203, 198, 209
77-77.9	197, 195, 206, 200
78-78.9	198, 198, 188, 193
79-79.9	198, 201
80-80.9	189, 212 (an abnormally large head in every way)
81-81.9	193, 185
above 82	188, 181, 198

¹ Having studied Anderson's article, "On the Relative Thickness of the Cranial Integuments" (*Journ. Roy. Anthropol. Inst.*, 1910, p. 272), we think an allowance of 1.5 is sufficient when comparing the breadth index for the skull with that for the living head, using the glabella-maximal length in both cases.

A characteristic group is that with cephalic indices 74–75.9. Of the 8 only 1 has a head length below 200 mm., whereas a measurement above 200 mm. becomes exceptional once the limit 77 is passed. The average of the 8 cases is 204, and a head of such length owes that length probably mainly to the size of the occipital projection. One may contrast this with the average length of 208 for the 4 extreme dolichocephals with flat heads and prominent glabellæ in the Plyllymon region.

The radial measurements showed that prognathism was frequent but not general.

The average stature for these eight characteristic cases is about 1695–1700 mm., *i.e.*, is about average (just under 5 feet 7 inches).

Among other facts from the cards we note the straightness of the nose, and a tendency towards swarthinness of complexion.

We therefore describe a Llandyssul variety with head length approximating to 204, head breadth to 153, head index to 75, stature about 1695 mm. Glabella not prominent, occiput well marked, nose straight, complexion inclined to swarthinness.

Those in our table who are not pure dark are probably in several cases merely modified through partial loss of eye pigment. Two of the reddish fair types have aquiline noses, and may perhaps be compared with certain Merionethshire types (*v. inf.*).

The percentage of red-haired men is 6.9, which is just below an average value and does not call for special comment. We note, however, that their cephalic indices are all above 76. The reds in the Plyllymon district were all above 75, save one.

Rolleston¹ states that an antiquary viewing Canon Greenwell's series of skulls would note that they could be separated into two groups. That made up of skulls from Bronze Age sepultures would show both dolichocephalic and brachycephalic skulls, the latter belonging to men of more powerful build than the former. That made up of skulls from Stone Age sepultures would show only dolichocephalic skulls. On p. 630 he says that Tacitus (*Agricola* XI.) speaks of the Silures as dark, and he adds that the modern black-haired type of the west is shorter in stature, feebler in development, and longer in skull form than the lighter haired and lighter complexioned variety. Rolleston therefore speaks of the longer skulls found with shorter skeletons, but in the long barrows and to the exclusion of brachycephalic forms, as belonging to this Silurian type. In this statement Rolleston was confirming the suggestions made long before by Professor Daniel Wilson. This view, here summarized from Rolleston, is now almost universally accepted.

Our work seems to support the approximation of the "Stone Age people" and the ancient and modern Silures of South Wales, as well as the other groups of

¹ Greenwell, W., and Rolleston, G., *British Barrows*, 1877, p. 627.

dark dolichocephals found in various parts of Wales, which is generally accepted, and we think it possible to go farther and to learn something of the factors which have promoted survival of this type in certain districts.

Remoteness and inhospitable character of the country are not sufficient to account for survival groups. They may be sufficient to account for survivals of this type, intermingled with one or more even older ones, on the Plynllymon moorland; but the Llandyssul and Llanybyther country, though admittedly "far west," is by no means so remote or so inhospitable as to be noteworthy in that respect. On further analyses of our cards we found another centre of this ancient type in the valleys cutting the landward edges of the moorland hills known as Mynydd Hiraethog in West Denbighshire.

TABLE 7.—THE DENBIGHSHIRE UPLAND (LANDWARD EDGES).

No.	Age.	Head length.	Head breadth.	Index.	Stature.	Map letter.
1	38	207	144	69·6	1680	<i>A</i>
2	adult	208	149	71·6	1860	<i>A</i>
3	47	196	141	71·9	1770	<i>a</i>
4	adult	209	152	72·7	1820	<i>a</i>
5	adult	199	145	72·8	1725	<i>a</i>
6	24	195	143	73·3	1830	<i>b</i>
7	adult	201	149	74·1	1580	<i>d</i>
8	53	190	141	74·2	1670	<i>d</i>
9	adult	198	147	74·2	1670	<i>D</i>
10	30	196	147	75·0	1665	<i>e</i>
11	19	201	151	75·1	1770	<i>e</i>
12	adult	186	140	75·3	1670	<i>E</i>
13	27	199	150	75·4	1610	<i>e</i>
14	42	195	147	75·4	1685	<i>E</i>
15	adult	204	154	75·5	1775	<i>x</i>
16	32	196	148	75·5	1585	<i>E</i>
17	adult	199	151	75·9	1615	<i>E</i>
18	30	204	155	76·0	1670	<i>F</i>
19	adult	192	146	76·1	1650	<i>f</i>
20	24	197	150	76·1	1760	<i>f</i>
21	24	201	154	76·6	1700	<i>f</i>
22	38	195	150	76·9	1740	<i>f</i>
23	adult	199	153	76·9	1680	<i>f</i>
24	21	194	148	76·3	1635	<i>r</i>
25	42	200	154	77·0	1720	<i>g</i>
26	45	192	148	77·1	1615	<i>G</i>

TABLE 7.—THE DENBIGHSHIRE UPLAND—*continued.*

No.	Age.	Head length.	Head breadth.	Index.	Stature.	Map letter.
27	adult	197	152	77·2	1630	<i>G</i>
28	38	198	153	77·3	1680	<i>g</i>
29	41	193	149	77·3	1735	<i>g</i>
30	adult	205	159	77·6	1745	<i>g</i>
31	29	193	150	77·7	1625	<i>G</i>
32	24	194	151	77·8	1780	<i>g</i>
33	adult	199	155	77·9	1740	<i>g</i>
34	53	191	149	78·0	1750	<i>r</i>
35	adult	190	149	78·4	1600	<i>H</i>
36	40	187	147	78·6	1695	<i>h</i>
37	40	192	151	78·6	1650	<i>H</i>
38	adult	193	152	78·7	1820	<i>H</i>
39	25	190	150	78·9	1710	<i>h</i>
40	adult	190	150	78·9	1660	<i>h</i>
41	adult	194	153	78·9	1675	<i>h</i>
42	47	193	153	79·3	1670	<i>j</i>
43	30	189	150	79·4	1675	<i>J</i>
44	40	189	150	79·4	1610	<i>j</i>
45	32	187	149	79·7	1600	<i>j</i>
46	20	189	151	80·0	1700	<i>k</i>
47	adult	195	157	80·5	1635	<i>k</i>
48	adult	192	156	81·2	1630	<i>l</i>
49	52	188	153	81·4	1645	<i>L</i>
50	30	189	155	82·0	1635	<i>M</i>
51	25	186	161	86·6	1885	<i>R</i>

This collection of fifty-one adult men with ancestry entirely on Mynydd Hiraethog and its valleys, and not at all in the Vale of Clwyd, is interesting in its resemblances to and small differences from the results gathered in the Llandyssul and Llanybyther district and in the Plynlymon region.

	Denbighshire moorland (landward edge).	Llandyssul, etc.	Plynlymon district.	Wales (men).
No. of cases	51	58	27	1850
Average cephalic index ...	77·0	77·6	76·1	78·0
Dark colouring	30 cases, <i>i.e.</i> , 58·8 per cent.	33 cases, <i>i.e.</i> , 56·9 per cent.	15 cases, <i>i.e.</i> , 55·5 per cent.	40·0 per cent.
Dark hair and light eyes ...	11 cases, <i>i.e.</i> , 21·6 per cent.	14 cases, <i>i.e.</i> , 24·1 per cent.	3 cases, <i>i.e.</i> , 11·1 per cent.	28·8 per cent.
Light colouring... ..	5 cases, <i>i.e.</i> , 9·8 per cent.	2 cases, <i>i.e.</i> , 3·5 per cent.	2 cases, <i>i.e.</i> , 7·4 per cent.	20·5 per cent.
Red hair... ..	3 cases, <i>i.e.</i> , 5·9 per cent.	4 cases, <i>i.e.</i> , 6·9 per cent.	7 cases, <i>i.e.</i> , 25·9 per cent.	7·3 per cent.

These three districts are thus distinctly darker than the average in colouring, the proportion of fair types being distinctly low. The average of cephalic indices is lower in each of these districts than it is for the whole country, and this is due to the marked predominance of the dolichocephalic types. The average for the Denbighshire moorlands would be lower if one omitted an obvious stray, No. 51, a red-haired man with index 86.6. In the Llandyssul case, again, one could reduce the average by omitting the rather isolated types Nos. 56, 57 and 58, with indices 82.3, 83.0 and 84.0 respectively. In the Plynlymon case Nos. 26 and 27 are isolated types with indices 82.7 and 83.0 respectively. The more distinctly broad heads are thus separated off from the general mass of the population in each case, and among the latter even moderately broad heads are uncommon.

The Denbighshire moorland is interestingly like the Plynlymon region in having a good number of people with cephalic indices below 73. Five among 51 is 9.8 per cent. as against 4 among 27, or 14.8 per cent. in Plynlymon district. The corresponding percentage for the whole of Wales is 2.75 per cent. The Denbighshire individuals, however, do not show the marked platycephaly which was so notable at Plynlymon, and the glabella is not so prominent among them. In Denbighshire we may thus say that the probable palæolithic admixture is less marked than it is on the Plynlymon moorland. The Denbighshire men, again, do not show the constancy of high head length that was noted especially among the dark men with indices 74 and 75 at Llandyssul. The majority in the Denbighshire case, apart from those with indices below 73, have the head length below 200.

The lowest index accompanying light colouring is 75.3 in the Denbighshire case, and the narrowest-headed red has an index of 76.3. These two characteristics do not appear to have any correlation with the more decidedly dolichocephalic character, a conclusion which we think has some importance both in connection with the definition of the fair types and in connection with the study of red hair and its inheritance. In the Plynlymon case all save one of the red heads have indices above 75, and at Llandyssul the narrowest-headed red has the index of 76.1.

On the whole the Denbigh moorland must be set down as a centre for neolithic stock, and here again extreme remoteness from "English" pressure cannot be postulated.

We have also ascertained beyond doubt that, as is generally accepted, a closely allied variety is common in the older established populations (Silures) of the coal valleys of Glamorgan and Monmouth, though we have intentionally avoided a "measurement campaign" in these districts, as it is so difficult to get useful details of family history in such an industrialized population. We have chosen a few individuals from the coal valleys of these southern counties as illustrating the type, and we give the following details. We would emphasize the fact that here alone has there been selection of types to be measured:—

Age.	Index.	Head length.	Head breadth.	Stature.	Face.	Map letter.
21	73·2	202	148	1700	Long—medium	b
40	73·6	197	145	1680	Long—medium	b
21	74·7	198	148	1725	Long	d
20	75·5	192	145	1690	Long	e
60	76·6	210	161	1630	Long	f

We think that, were it practicable to take large series of measurements of truly indigenous types, they would be found to approach the above examples closely. The last, it should be noted, was a man of super-normal ability and measurements.

If an extended series from the Glamorganshire and Monmouthshire coal valleys were compared with the Llandyssul and the Denbighshire series, it would probably be found that the men in the former were rather shorter, of somewhat smoother facial contour, and, in healthy surroundings, of fresher colour than those in the latter.

The men in these three districts of the Hiraethog (Denbighshire), Llandyssul-Llanybyther, and the Coal Valleys we therefore claim to show as a predominant type, the long head with dark colouring and moderate stature. How far this may be claimed to be a local type will be judged better after inspection of our tables for Ardudwy, the Bala cleft, New Quay, Llanidloes, etc.

The fact of the survival of ancient types in special numbers in these districts long remained a puzzle to us, as they are by no means the remotest parts of Wales, neither can they be said to be "farthest west." The theory of displacement under westward pressure having been set aside, another hypothesis developed in unsuspected fashion through another geographical inquiry which may be mentioned briefly.¹

The boundary between Cardiganshire and Carmarthenshire for some distance is the River Teifi, a strong, swift river, with a deep trench-like valley in the vicinity of Llandyssul. To north and to south are wide-spreading uplands which the river divides. They are now sparsely peopled, and the population is gathered in hamlets and a few villages near the river-bridges or along the riverside road and its junctions with roads from tributary valleys. It thus happens that some aggregations of population, especially those around bridgeheads, are partly in one county (Cardiganshire to the north of the river) and partly in another (Carmarthenshire to the south of the river), and the arrangement is manifestly inconvenient for modern administration.

The boundary is a very old one, and we get a hint of its meaning in the stories, which state that Ceredig, one of the sons of Cunedda, probably between

¹ Fleure, H. J., *Archaeologia Cambrensis*, April, 1913, p. 153.

the sixth and the eighth centuries, overran the country as far south as the Teifi valley and founded the kingdom of Ceredigion, while, later on, his descendants further overran the country between the Teifi and the Towy (North Carmarthen-shire).

The suggestion here is that the Teifi valley was an obstacle to be crossed, whereas nowadays it would be a line of penetration and of communication. The prime factor of this difference is probably that, before man interfered, the valley sides were forested while the valley bottom was a mixture of woodland and swamp, save where it was rocky with a roaring torrent. In the woodland, also, would roam the wolf and boar. The upland, on the other hand, would be kept bare of trees by the free course of the sea-winds over it.

The uplands north and north-west of the Teifi, and also the upland to the south of the Teifi, would thus have formed fairly natural and distinct units in early times, before man was sufficiently equipped to attack and destroy the damp woodland and its wild beasts.

This view is supported by the fact that the uplands possess what are almost certainly ridgeways (ancient tracks), with hut sites, tumuli, standing stones, earthworks and other evidences of their former value and importance. The earthworks in many cases are seen to have stood out on promontories overlooking and projecting into the valley woodland, *e.g.*, Dinas Cerddin above Llandyssul.

Other support for this view is also available:—

1. There are other cases of river boundaries which may not suit modern convenience but are retained as a heritage, *e.g.*, the Conway between Carnarvonshire and Denbighshire, and the Wye as a boundary of Radnorshire.
2. Old administrative divisions often take their names from what are now relatively unimportant farms, earthworks, etc., on the upland, *e.g.*, the hundred of Moeddyn in South Cardiganshire and Kittwr in South Glamorganshire.
3. The divisions of old parishes, the sites of old parish churches, and many other facts help to emphasize the former importance of the upland plateau as against the valley, in Wales.

The general conclusion, then, is that whereas in modern times man occupies the valleys, drains and cultivates them, and makes them his lines of communication, building his villages, towns and cities at their nodes, in ancient times they were barriers. Especially was this the case in the days when he still had only stone, wood and bone tools. He was ill-equipped to cope with the wolf-haunted woodland and the ague-infested swamp, and was thus restricted to the uplands for his settlements. A map of the distribution of population in South Britain in the Stone Age would thus be very nearly the converse of a corresponding map for the present day. Then, speaking broadly, the population, save for the coastal fringe,

would be in large part above the 400 or the 500 feet contour line at least; now the great majority of people live at a lower level. A very similar hypothesis has been worked out by E. Kitson Clark,¹ as we have since learned, and of course it underlies a great deal that has been written elsewhere.

The hypothesis needed to be developed one step farther before it became really valuable in connection with the study of distribution of human types, and helped to show why the uplands specially discussed above were the characteristic nests of the ancient stocks.

The Welsh uplands show considerable natural differences. In Montgomeryshire, for example, the whole valley system, and with this the upper limit of shelter, is higher than it is near the sea. Moreover, the sea winds and their salt have less power than on the coastal plateaux. For these reasons the natural tree-limit tends to be higher inland, and the primeval open country would thus be very cold and bleak, especially considering its distance from the tempering influences of the sea in autumn and winter. On many parts, however, the woodland must have been a fairly open one.

The inland plateaux in Wales, for the most part, had another disadvantage in ancient times. Wales is largely built of grits and shales of Palæozoic age which are most difficult to chip, and also do not easily grind down into sharp-edged forms. On the other hand, the sea beaches of Wales possess accumulations of flint sorted out, with many other foreign pebbles, from boulder clay brought into the Irish Sea and Cardigan Bay by the great ice-sheets which travelled southward down the Irish Sea in the Ice Age. Indeed, the existence of enormous quantities of these materials along the modern shores of Cardigan Bay hints strongly that there was once a large stretch of boulder-clay land, perhaps what would be called in Welsh a "morfa," in what is now Cardigan Bay. That it lasted on into human times is further hinted by the well-known legend of the "Cantref-y-Gwaelod," or "Lowland Hundred," elaborated by Thomas Love Peacock in *The Misfortunes of Elphin*. Still further, the beaches, estuaries and pools of the lowland afforded food supplies of considerable value, perhaps especially in winter.

We thus see that the uplands near the coast of Wales were on the whole far more favourable locations for, let us say, Stone Age man than were those farther inland. Their moderate elevation, their freedom from dense woodland, their flint and food supplies on the beaches and in the low river-reaches and estuaries, all contributed to their value. The coast also afforded a line of intercommunication, perhaps permitting such spreading of implements and material as would account, for example, for our finding a (ground) stone axe made of rock occurring at or near St. David's Head (Doleritic rock) at a place near Ystrad Meurig in North Cardiganshire.

¹ Clark, E. Kitson, "A Prehistoric Route in Yorkshire," *Proc. Soc. Antiquaries London*, 1911, 2 S., xxiii, 309.

It is beyond our present province to discuss whether fine chipping of flint and stone grinding are equally old, or whether the former is the older in this country; but it may be pointed out that the ability to grind implements down carried with it the possibility of population settling in greater numbers on the ancient hard rocks of the Border (Breidden, Corndon, Long Mountain, Longmynd).

The general conclusion, thus far, is that the ancient population was most concentrated on the more extensive uplands near the coast. Now this includes the uplands near the various locations of the survival groups already mentioned (Fig. 6).

1. Between the remarkable parallel valleys of Glamorganshire and Monmouthshire run lines of moorland top, rising, it is true, to considerable heights (1800 and 1900 feet in some cases), but for the most part sloping sunward and seaward, and thus both warmed and kept fairly clear of trees. Mynydd Margam and Mynydd Gelligaer may be mentioned specially. In each case there seems ample evidence of early importance of the moorland, and of a valleyward shift of the population.
2. Between Teifi and Towy is the upland, deeply seamed by river gorges, which rises into the Prescelly Hills and goes out seawards to St. David's Head. It is mostly at a moderate height. Here again are abundant traces of prehistoric importance.
3. South Cardiganshire is a most characteristic coastal upland with the same evidences of upland life.
4. Behind Aberystwyth are characteristic fragments of the coastal plateau projecting like fingers from the higher plateau inland (Plynlymon district) and possessing ridgeways, earthworks, etc., etc.
5. The Hiraethog district of Denbighshire shows the same characteristics as the above, save that its slope down to the sea is of course northward.

It will now be perceived that the argument may be carried a step farther. We claim that the existence of neolithic survivals in considerable numbers in these districts is due to the persistence of these types near their early and natural locations, and to their valleyward movement from such locations. In other words, we claim the hypothesis of long persistence or resurgence, almost, if not quite, *in situ*, as the most valuable hypothesis for explaining the distribution of racial types in Wales.

It should be stated that, after working out these facts some years ago, we found that Abercromby¹ and Peake² had attained a very similar point of view by different roads. They had traced the "Bronze Age pottery" along the Downs of

¹ Abercromby, J., *Bronze Age Pottery*, 1912, especially p. 81.

² Peake, H. J. E., *Memorials of Old Leicestershire*, p. 32 ff.

South England, and suggest that the Midlands were then almost uninhabited, so that the site of importance "next" to the Downs is the High Peak. One question arises concerning other locations of early man, in Wales and in England as well, which do not appear to be characteristic spots for neolithic types nowadays. Such are Anglesey, the Downs of South England, the Vale of Glamorgan, etc. In nearly every such case we find that the district is open to invasion, or has obviously been a line of invasion, particularly from the sea, and we shall find certain other characteristic types in these areas.

In conclusion of this particular argument we may state that we have evidence of the presence of the neolithic types around the inland plateaux (especially in North Montgomeryshire) as well as around the coastal ones here discussed, but the discussion of general distributions is postponed till the scheme of observation now being carried out is completed.

It should be noted that the Welsh uplands, on the hypothesis worked out above, would be very definitely separated from the English ones by the basins of the Dee and the Severn, which would act as barriers. A probable line of connection would exist between Barry and the hills near Weston, but otherwise the Glamorganshire hills would be very isolated from the country of the Cotswolds, etc. We can thus understand the more readily the persistence in a very marked degree of the dark, dolichocephalic people who are, without any doubt, the people described under the name of Silures by Tacitus. Abercromby says that his types of pottery were late in reaching Wales.

Between the Dee basin on the north and the Severn basin on the south are fragmentary uplands: the Breidden hills, the Long Mountain, Longmynd, Wenlock Edge, Brown Clee, Wrekin, Cannock and other Chases, and so on. Perhaps it was along these that influences and waves of population had to spread into Wales in early times, unless they came along-shore, or by sea, as they must have done in some cases.

The fragmentary route here suggested leads towards the North Montgomeryshire plateau, a circumstance not without interest in connection with the occurrence of certain types of man in the Bala Cleft (*vide infra*) just to the north.

The above argument is worked out in more detail in its general bearing as regards the early centres of population and the valleyward movement of people in another article.¹

Analysis of the Tregaron District Tables. (p. 76.)

In these tables we give details of thirty-four men who belong to this district by descent, and it is at once seen that the table differs markedly from that for Llandyssul, for example.

¹ Fleure, H. J., and Whitehouse, W. E., "Early Distribution and Valleyward Movement of Population in S. Britain," *Archaeologia Cambrensis*, 1916.

The proportions of dolichocephalic darks (index below 79) is interesting in comparison with that found for Plynlymon and for Llandyssul.

	per cent.		per cent.
Tregaron district, 10 out of 34 = 29.4.		Total of darks, 11 out of 34 = 32.4.	
Llandyssul „ 24 „ „ 58 = 41.4.		„ „ „ 33 „ „ 58 = 56.9.	
Plynlymon „ 13 „ „ 27 = 48.2.		„ „ „ 15 „ „ 27 = 55.5.	

The proportion of dark dolichocephals is thus much lower than in these other cases.

In the Llandyssul table, on the other hand, there is practically only one man who is entirely fair, while there are six of them on our Tregaron list. Of these fair types one only (73.2) has a cephalic index below 78, showing that, as elsewhere, the more pronounced dolichocephaly is in Wales only rarely associated with fair colouring. The “Reds” are the most interesting of all the groups.

Tregaron district, 9 out of 34 = 26.5 per cent.
Llandyssul „ 4 „ „ 58 = 6.9 „ „
Plynlymon „ 7 „ „ 27 = 25.9 „ „

Tregaron, therefore, deserves the name of a “Nest of Red Hair,” and it is to be noted (see map) that red hair is not specially marked in the country round about.

This conclusion supports popular opinion, which associates fair-red hair, accompanied by rather broad faces and strong zygomatic arches, with the Tregaron people. As to the zygomatics our measurements, perhaps, give some slight support to this popular belief, for whereas in the twenty-five non-red individuals the bizygomatic breadth is 90.1 per cent. of the head breadth, in the nine reds it averages 91.6 per cent. This, however, is a point it would not be wise to emphasize, especially as one knows how often the zygomas project because of the more or less sunken condition of the cheeks below.

It is worth noting that seven out of the nine reds at Tregaron have indices of 77.0 and over, only two being markedly dolichocephalic (73.6 and 74.7). This is similar to what was noted for Llandyssul and Plynlymon. Six out of the nine have large heads (maximum length 200 mm. or over). Prognathism does not seem to be associated with red hair here but several of the subjects have brown flecks, at least, in their eyes.

In the case of Plynlymon district, an archæological speculation showed one possible origin of the “Red Nest,” but the existence of well-marked fair and dark types side by side without marriage-barriers is a characteristic of both districts. Some suggest, in a tentative way, that redness of hair appears where light and dark are crossed, perhaps where they are crossed repeatedly; perhaps one particular dark type is more specially concerned.

TABLE 8.—TREGARON AND LLANDDEWIBREFF DISTRICT.

(The letters on the map, Fig. 1,* are enclosed by a broken line.)

Bizy. = Bizygomatic Breadth.

Per. H.B. = Percentage Bizygomatic Breadth to Head Breadth.

No.	Cephalic index.	Head length.	Head breadth.	Stature.	Age.	Map letter.	Bizy.	Per. H.B.
1	73·2	209	153	1630	61	B	145	95·2
2	73·6	197	145	1675	32	<i>r</i>	137	94·5
3	74·6	205	155	1715	24	<i>d</i>	141	91·0
4	74·1	201	150	1740	27	<i>d</i>	129	86·0
5	74·7	202	151	1650	21	<i>r</i>	135	89·4
6	74·8	187	140	1700	22	<i>D</i>	125	89·3
7	75·0	200	150	1760	21	<i>e</i>	136	90·7
8	75·1	205	154	1590	54	<i>e</i>	141	91·6
9	75·5	192	145	1680	19	<i>e</i>	137	94·5
10	76·0	200	152	1600	32	<i>f</i>	138	90·8
11	76·0	204	155	1745	56	<i>f</i>	143	92·3
12	76·9	199	153	1700	21	<i>F</i>	140	91·5
13	77·0	200	154	1740	22	<i>r</i>	137	89·0
14	77·2	206	159	1735	55	<i>r</i>	148	93·0
15	77·3	203	157	1675	34	<i>G</i>	140	89·2
16	77·4	195	151	1815	29	<i>g</i>	138	91·4
17	78·1	206	161	1800	27	<i>r</i>	144	89·4
18	78·5	196	154	1870	21	H	138	89·6
19	78·5	196	154	1740	19	<i>r</i>	142	92·2
20	78·5	195	153	1735	20	<i>H</i>	130	85·0
21	78·7	193	152	1705	23	<i>h</i>	137	90·1
22	78·7	189	149	1555	61	<i>h</i>	131	88·0
23	78·9	199	157	1755	28	H	143	91·1
24	79·2	207	164	1775	adult	<i>J</i>	141	86·0
25	79·5	200	159	1745	48	<i>J</i>	154	96·9
26	79·7	192	153	1625	20	<i>J</i>	136	88·9
27	80·1	191	153	1705	23	<i>x</i>	132	86·3
28	80·1	191	153	1630	30	<i>k</i>	135	88·2
29	80·4	194	156	1710	24	<i>K</i>	140	89·7
30	81·1	191	155	1630	adult	<i>L</i>	140	90·3
31	81·2	208	169	1765	24	<i>R</i>	150	88·8
32	81·3	204	166	1800	33	<i>R</i>	150	90·4
33	81·4	188	153	1675	26	<i>L</i>	136	88·9
34	81·5	195	159	1680	65	<i>R</i>	154	96·9

Notes on other Characteristic Samples from Cardiganshire (Tables 9-11, pp. 79 and 80).

1. Newcastle Emlyn.—Our sample from this neighbourhood is unfortunately small, as so many of the people measured here were of mixed descent or immigrants, that is, had ancestors (usually grandparents) from other parts of Wales. Of the twenty-one accredited to our sample, eight are distinctly fair, *i.e.*, 38.1 per cent., and this sample therefore offers a very marked contrast to that from Llandyssul, especially as there are here comparatively few native dark dolichocephals. At Llandyssul the native fair types were only two among fifty-eight, *i.e.*, 3.5 per cent.

From our cards we have further sorted out eleven relating to men whose ancestry is traceable in part in the Newcastle Emlyn district. Of these eleven, four are fair, and there is the same scarcity of the dark dolichocephals. It is noteworthy, too, that reds are uncommon, one among the twenty-one and none amongst the eleven having this character. Among the twelve fair individuals only one has an index (74.8) below 76.

In spite of the smallness of numbers there is thus ground for endorsing the current opinion concerning the local type. The district is a nest of a fair-haired, blue-eyed stock. The type is fine featured and well built, often tall, and the zygomatic arches are not prominent as they are in the Tregaron stock. (In the eight fair men the bizygomatic breadth averages only 87.8 per cent. of the head breadth.) In fact these Newcastle Emlyn people suggest a rather Scandinavian or Nordic type and they are quite distinct from most of their compatriots physically, so much so that they are rarely taken to be Welshmen by those who see them elsewhere. They resemble the type so often found among the leisured and sporting classes in England. Our cards show that in several cases the ancestry is fair on both sides, and it is said that the type has a distinct preference for mating in its own colouring.

A very tentative suggestion may be offered as to the existence of this "Scandinavian" nest, but it is offered not so much as a hypothesis as to hint at lines of archaeological inquiry.

Newcastle Emlyn is a hill almost isolated by the looping of the River Teifi. It is, as it were, split off from that large moorland to the north, which, in considering Llandyssul, we have argued was an ancient home of dark dolichocephals. Elsewhere along the river's course from the mouth up to Llandyssul there are few such isolated defensible sites available for settlement. It is thus just possible that intruders from the sea, penetrating up the river, might seize this hill and hold their own here without necessarily having gained possession of the moorland. An earthwork on the northern side of the river-mouth, on a low promontory, has been ascribed to Norsemen, and its features certainly suggest that it was possessed by owners of boats, but this is not evidence of any value, pending examination of some graves on this earthwork, as to provenance of the occupiers. Whether inquiry concerning place-names, dialects, customs, etc., would bring

support for the hint thrown out or whether some alternative hypothesis, perhaps of settlement or garrisoning by transport from Pembrokeshire, would not be better, is a matter that must be left for the present.

2. Newquay.—The little sample of eighteen men of Newquay descent has some points of considerable interest. In spite of its being on a coastal bay suitable for anchorage, Newquay is by no means distinguished for "Scandinavian" types, only two of our samples being referable to this. On the other hand, eight of the eighteen have cephalic indices of 80 and above, and seven of these eight are distinctly dark, *i.e.*, 44·4 per cent. of the sample have indices of 80 and above, and 39 per cent. are "dark broads."

					Indices of 80 or above.	"Dark broads."
					Per cent.	Per cent.
Newcastle Emlyn	...	...	...	...	5 out of 21 = 23·8	2 or 9·5
Tregaron	...	...	...	...	8 " " 34 = 23·5	1 " 3·0
Llandyssul	...	...	...	...	8 " " 54 = 14·8	6 " 11·1
Plynlymon	...	...	...	...	3 " " 27 = 11·1	1 " 3·7
Newquay	...	...	...	...	8 " " 18 = 44·4	7 " 39·0

The importance of the "broad dark" element is therefore fairly marked, but the smallness of the numbers would prevent our emphasizing it if the case stood alone. Our general observation has, however, shown that a similar "coastal" nest of broad darks occurs on Pen Caer, a peninsula of fisherman-farmers west of Fishguard and Goodwick, and we shall find another patch of much greater size and importance on the Ardudwy coast. The discussion of its meaning and of possible correlations may be deferred till that is considered. The complete absence of the markedly narrow-headed dark men from our Newquay sample is noteworthy.

It may be mentioned that two other individuals were measured whose indices were in the neighbourhood of 84, but they are omitted as being outside our age limits of 19 and 65.

The contrast between these two small samples is a marked one, and in so far as it is not due to smallness of sample, and of course the sample taken at each place was, as usual, much larger than the list given, it is possible to suggest a few points for comparison. While at both places there are persons who would naturally be referred to the neolithic type, at Newcastle Emlyn there is a fairly marked "Scandinavian" element, and at Newquay there is a distinct strain of dark brachycephaly. In both cases we think the strain mentioned is characteristic of the locality and, at least not in any marked degree, of places near by.

TABLE 9.—NEWQUAY SAMPLE.

(The letters on the map, Fig. 1, are enclosed by a broken line.)

No.	Age.	Index.	Head length.	Head breadth.	Stature.	Map letter.
1	28	76.4	199	152	1725	<i>f</i>
2	20	76.4	204	156	1780	<i>f</i>
3	24	76.6	210	161	1715	F
4	50	76.7	193	148	1660	<i>F</i>
5	adult	76.8	203	156	1650	F
6	19	77.0	196	151	1620	<i>g</i>
7	30	77.0	200	154	1655	<i>g</i>
8	49	77.4	195	151	1635	<i>g</i>
9	20	78.3	194	152	1625	<i>h</i>
10	65	79.5	195	155	1660	<i>j</i>
11	19	80.0	190	152	1645	<i>k</i>
12	49	80.3	203	163	1780	<i>K</i>
13	52	80.8	203	164	1715	<i>k</i>
14	42	81.9	193	158	1685	<i>l</i>
15	23	82.7	185	153	1720	m
16	25	83.8	185	155	1675	<i>n</i>
17	30	85.0	186	158	1665	<i>p</i>
18	30	85.4	185	158	1730	<i>p</i>

TABLE 10.—NEWCASTLE EMLYN SAMPLE.

(The letters on the map, Fig. 1, are enclosed by a broken line.)

No.	Age.	Index.	Head length.	Head breadth.	Stature.	Map letter.
1	36	73.0	200	146	1680	<i>B</i>
2	48	73.7	205	151	1805	<i>B</i>
3	adult	73.6	201	148	1660	<i>b</i>
4	adult	74.7	198	148	1550	<i>x</i>
5	adult	74.9	195	146	1780	<i>D</i>
6	61	76.0	196	149	1640	F
7	61	76.3	198	151	1590	<i>F</i>
8	65	77.2	206	158	1780	G
9	30	77.3	211	163	1670	G

TABLE 10.—NEWCASTLE EMLYN SAMPLE—*continued.*

No.	Age.	Index.	Head length.	Head breadth.	Stature.	Map letter.
10	21	77·3	198	153	1770	G
11	58	77·5	209	162	1675	G
12	31	78·2	188	147	1705	h
13	49	78·9	189	149	1670	h
14	24	78·9	199	157	1560	H
15	59	79·0	205	162	1725	J
16	adult	79·8	203	162	1815	j
17	45	80·5	200	161	1745	K
18	adult	81·2	202	164	1700	L
19	20	82·1	190	156	1715	R
20	50	82·1	195	160	1675	m
21	28	83·6	189	158	1780	n

TABLE 11.—ADULT MEN WITH PART-ANCESTRY AT NEWCASTLE EMLYN.

No.	Age.	Index.	Head length.	Head breadth.	Stature.	Map letter.
1	36	74·8	210	157	1720	D
2	52	75·1	201	151	1775	E
3	36	76·8	191	147	1720	F
4	adult	77·3	193	149	1650	G
5	adult	77·8	185	144	1660	g
6	adult	78·2	193	151	1740	x
7	49	78·9	189	149	1670	h
8	28	79·9	199	159	1725	J
9	adult	80·8	193	156	1720	k
10	61	81·6	196	160	1665	L
11	28	81·9	183	150	1775	L

The Cardiganshire Map (Figs. 1 and 3-5).—General Analysis.

A cursory inspection of the Cardiganshire map reveals two facts :—

1. There are distinct centres with characteristic types.
2. There are more or less distinct regions, each with its own proportions of the various stocks.

The distinct centres are dealt with individually above; they are enclosed in continuous lines on the map.

The regions which seem marked out most reasonably are as follows :—

- (a) North Cardiganshire, north of the Ystwyth and Wyre valleys (these form an almost straight line E.N.E.—W.S.W. on the map).
- (b) Mid Cardiganshire, which we shall take to be the region between the Wyre and the Ystwyth line on the north and the Aeron line farther south.
- (c) South Cardiganshire, including the Pembrokeshire and Carmarthenshire sides of the Teifi valley, and the country towards Mynydd Prescely in North Pembrokeshire.

The northern division includes mainly the Plynlymon moorland, together with the coastal plateau which forms its western edge. We have avoided getting measurements from Aberystwyth itself as that has been for centuries a centre of somewhat more than purely local consequence, though on a very small scale; its population is therefore very mixed if one attempts to inquire far back.

The middle division includes a stretch of fairly low and generally approachable coast, this characteristic appearing suddenly just south of the Wyre boundary. Behind this coast is the moorland of Mynydd Bach, and behind this the swampy, central section of the Teifi basin.

South Cardiganshire is the moorland described in connection with Llandyssul, together with its fringing valleys leading down either to the sea or to the Aeron or Teifi.

The Teifi valley is quite narrow from Llandyssul westward to the sea, *i.e.*, the plateau edge comes very near to the river.

The following analysis for the three districts and the county summarizes the facts on the map :—

Ceph. index.	North section.			Middle section.			South section.			Totals.		
	Dk. Hair. Lt. Dk. Eyes. Fair.			Dk. Hair. Lt. Dk. Eyes. Fair.			Dk. Hair. Lt. Dk. Eyes. Fair.			Dk. Hair. Lt. Dk. Eyes. Fair.		
Under 73 ...	5	+	0 + 1	2	+	0 + 2	2	+	1 + 1	9	+	1 + 4
73 to 73·9 ...	4	+	3 + 0	1	+	1 + 2	4	+	4 + 0	9	+	8 + 2
74 to 74·9 ...	4	+	0 + 2	8	+	2 + 0	9	+	0 + 2	21	+	10 + 4
75 to 75·9 ...	5	+	3 + 2	12	+	4 + 3	13	+	11 + 1	30	+	18 + 6
76 to 76·9 ...	4	+	3 + 1	5	+	7 + 3	16	+	10 + 5	25	+	20 + 9
77 to 77·9 ...	6	+	6 + 2	5	+	7 + 7	12	+	8 + 8	23	+	21 + 17
78 to 78·9 ...	5	+	2 + 3	7	+	9 + 8	18	+	5 + 4	30	+	16 + 15
79 to 79·9 ...	8	+	7 + 1	5	+	7 + 11	9	+	8 + 4	22	+	22 + 16
80 to 80·9 ...	2	+	4 + 4	8	+	6 + 4	11	+	8 + 3	21	+	18 + 11
81 to 81·9 ...	2	+	1 + 1	6	+	1 + 2	6	+	3 + 2	14	+	5 + 5
82 to 82·9 ...	1	+	1 + 2	1	+	2 + 1	5	+	3 + 1	7	+	6 + 4
83 to 83·9 ...	2	+	1 + 1	0	+	1 + 2	3	+	1 + 1	5	+	3 + 4
84 and above	0	+	0 + 0	2	+	1 + 0	3	+	0 + 0	5	+	1 + 0
	48	+	31 + 20	62	+	48 + 45	111	+	70 + 32	221	+	149 + 97
Reds ...	11			16			14			41		
x ...	4			7			10			21		
	114			178			237			529		

Note that the numbers for each index do not include the people with red hair nor the people with light hair and dark eyes (marked x on maps), both of these being given separately at the end of each list.

Comparing the proportions of dark dolichocephals (index below 79) in the three districts, we notice that they form 28·9 per cent. in the north, 22·5 per cent. in the centre, and 31·2 per cent. in the south. The two moorlands previously noticed seem to us to account for the higher percentages of north and south against the centre.

Comparing the proportions of fair men, we notice that the percentages are 17·5 in the north, 25·3 in the centre, and 13·5 in the south. This last low value would be much lower still were it not for the "nest" of fair people at Newcastle Emlyn.

The centre is thus noteworthy for its greater proportion of fair types and, looking at the table, we see that the distribution of cephalic index among them tails off on either side from a maximum between 77·0 and 79·9, *i.e.*, the range of variation suggests that we are dealing with one type which tends to dolichomesaticephaly, and this is the general impression one gets from a study of the fair type everywhere. The range of variation among the fair types in the south of the county bears this out, as does the analysis of the Newcastle Emlyn district.

Our suggestion is that the importance of this type (a widely known fact) in

the central section of the county is to be connected with the openness of the coast, and, for aught we know, perhaps with exchanges between this region and the Leinster coast opposite. To north and south, however, the moorland is more sharply marked and we get more definite and predominant occupation by the neolithic type. In the north, Aberystwyth forms almost the only reasonable entry from the sea. In the south the plateau comes so near to the sea edge along the coast and at the Teifi mouth that it does not suggest opportunities for easy penetration.

It should also be noted that the upper Ystwyth line has long been known as a copper region, and this may have drawn adventurers in times past from the sea to the open coast just south of the Ystwyth-Wyre line. An interesting series of earthworks defends the flanks of this line.

The somewhat persistent occurrence of two maxima among the dark dolichocephals, one about index 75 or 76 and one about 78 or 79, is noteworthy, as it is a general feature. There seems, indeed, very little doubt that among the dark dolichocephals we have several sub-types, as will be discussed in greater detail hereafter.

Reviewing the whole county, we note the following chief points discussed at greater length in the preceding pages :—

1. The importance of dark dolichocephals all over the county, but especially on and around the northern and southern plateaux.
2. The presence of various sub-types of the above (*e.g.*, around Plynlymon and around Llandyssul).
3. The importance of dark dolichocephals on the slopes of the south plateau.
4. The presence of "red nests" at Tregaron and on the Plynlymon moorland.
5. The importance of the fair type (mostly mesaticephalic) in the centre where the coast is open and low.
6. The surprising character of the sample from the district around the Teifi mouth. Here the fair type is a very small, even unusually small, proportion, and broad heads are also scarce, though they become commoner southward as one approaches Pencaer. We think that the near approach of the plateau edge to the river bank in this region helps to account for the character of this sample, which, on the whole, approaches that discussed for Llandyssul district sufficiently closely to corroborate the conclusions drawn from the study of that district, and not to need a similarly detailed analysis. The one difference here is the presence of larger numbers with dark hair and light eyes, in fact the number of these here exceeds the number with both these features dark, and this is of very exceptional occurrence.
7. The "fair nest" at Newcastle Emlyn. It would be unwise to insist on any hypothesis to account for this, but we may just note that it does not seem to us to be connected with the "fair" sprinkling of the centre of the county nor, specially, with the fair people so characteristic of South

Pembrokeshire. It is just possible that fair types penetrating up the Teifi estuary would be swamped by the plateau types farther down, the valley being so narrow, perhaps leaving the lightness of the eye as a trace of their passage. They might, however, maintain themselves more easily on the isolated and long-fortified hill of circumdenudation, on which Newcastle Emlyn is built. Influence of military garrisons, etc., could be suggested, but that type of influence seems weak in most cases and we are therefore chary of utilizing such hypotheses. The spread of Fleming influence from Pembrokeshire up to the centre of Cardiganshire is, however, a possibility (see p. 113).

8. The little "broad-dark" group at Newquay. It should be noted that we have avoided Aberayron, because it is a town of recent (eighteenth-century) growth.
9. The special character of the Plynlymon sample and the influence of that character on the types round about.

Cardiganshire was appropriate for detailed study, not only because it was our home county, but also because it is probably the county which is the least touched by recent alterations. It has now for a long time been sending out men, in fact they are beyond question its chief export.

MERIONETHSHIRE.

(See Tables 12 and 13, pp. 90-97, also Figs. 2 and 3-5.)

Comparing our map register of Merionethshire with that for Cardiganshire, we note some marked differences. (Figs. 2 and 3-5.) There are no well-marked nests of dark dolichocephals, nor is there a nest of reds, such as there is at Tregaron. A table herewith helps to make this clearer. The percentage number of dark dolichocephals of the more marked variety is given below for Merionethshire and for Cardiganshire and North Cardiganshire, classified under the map letters, but in the totals for Merionethshire are included several persons who could not be registered on the map because of ancestral links with too widely separated parts of the county.

Map letter.	North Cardiganshire.	Cardiganshire.	Merionethshire.
a or <i>a</i>	4.4 per cent.	1.7 per cent.	0.9 per cent.
b or <i>b</i>	3.5 "	1.7 "	0.6 "
d or <i>d</i>	3.5 "	4.0 "	3.0 "
e or <i>e</i>	4.4 "	5.7 "	5.2 "
Total	15.8 "	13.1 "	9.7 "
Number of cases	114	529	329

The high values for a and b in the case of North Cardiganshire are connected with the peculiarities of the Plynlymon moorland already noticed, but the ancient dark dolichocephalic type is much more marked throughout the county than it is in Merionethshire.

On the other hand, the percentage numbers of dark brachycephals in Merionethshire is considerably higher than in the other districts just named. A table classified under the map letters (*L-p*) will show this, and will show especially that the percentage of these types on the Ardudwy coast (Barmouth estuary northwards) is remarkably high.

Map letter.	North Cardiganshire.	Cardiganshire.	Merionethshire.	Ardudwy coast of Merionethshire including Valley of Ffestiniog.
l or <i>l</i>	1.8 per cent.	2.6 per cent.	4.0 per cent.	6.2 per cent.
m or <i>m</i>	0.9 "	1.3 "	3.0 "	5.3 "
n or <i>n</i>	1.8 "	0.9 "	1.2 "	1.8 "
p or <i>p</i>	0.0 "	0.9 "	2.1 "	5.3 "
Total	4.5 "	<i>Circa</i> 5.8 "	10.3 "	18.6 "
Number of cases	114	529	329	113

The coast of Northern Merionethshire may thus be considered a centre of "broad darks," and may be compared with the little nest of these types at Newquay, Cardiganshire, while the whole county stands contrasted with Cardiganshire as regards the proportion of dark dolichocephals (of marked type).

Having found a geographical hypothesis useful in understanding our Cardiganshire figures, let us examine the case of Merionethshire.

In this county, save behind the coast near Harlech, there is little of that open moorland country, at reasonable elevation but above the primitively forested or swampy valleys, which seems to have been the natural location for neolithic man.

In Merionethshire, for the most part, the deep-cut valleys have rugged sides rising sharply to the rocky mountain crags. The open country, under primeval conditions, must have been not only very high and rock-strewn, but also cold, away from the sea. It thus bears out our working hypothesis when we find that the neolithic (Mediterranean) type is not by any means so conspicuous in Merionethshire as in Cardiganshire. The general ruggedness of some of these great valleys leaves one in doubt as to whether they were afforested, but, even if they were not, they would be lines of passage rather than of settlement.

The "open country" behind Harlech fronts the coast, and may be compared with that of South Cardiganshire. In both cases (Newquay district and this Ardudwy coast) we find the dark brachycephals as a conspicuous element. In the

case of South Cardiganshire, however, there is a large extent of open country, and it ultimately breaks down into a fair valley landwards, and in that valley (Llandyssul and Llanybyther) the dark dolichocephals are dominant. In Merionethshire, on the other hand, the open country of this type is limited and goes back landwards into rocky mountain country (Rhinog).

We therefore suggest that the early population of Merionethshire was a very limited one, and that the county was first effectually occupied at a later stage than Cardiganshire. Certain types markedly contrasted with the chief ones of Cardiganshire are characteristic, and our hypothesis is that they are descendants of immigrants or invaders later than the fundamental and supposedly neolithic type. Our view would be, that while such types may have spread in both counties, they have persisted better where their inheritance could not be washed out by a strong indigenous strain such as was present in Cardiganshire.

If we study the map-registers for the great valleys of Merionethshire, the great fault valley through Bala, Llanuwchllyn, Tallylyn, and Towyn, with its branch valley through Dolgelly, and the side valley up to Trawsfynydd, we notice a few peculiarities.

1. Twenty-six of the 138 men registered have noses of markedly convex outline, sometimes almost regularly curved, sometimes more or less angulated; these are currently known as Roman noses and can also be compared with those on the profiles in bas-relief found among the ruins of the Hittite cities.

2. The men showing this character are represented by the following letters:—

F f G G G G H H H h h J J j j K K k k L L M m m r R

Of these 26, 10 therefore are dark-haired with light eyes, 5 are fair. None of them belong to the extreme dolichocephals, and those with index 80 or above are about thirty-five per cent. of the sample. Outside this region the number of people with dark (including medium brown) hair and light eyes in the two counties chosen is practically never as high as that of more completely dark people, while here it is 52 against 50, and for the "Roman-nosed" people the numbers are 10 and 9.

3. Among the men registered for Llanuwchllyn, Bala, etc., numbering 69, no less than 26 are distinctly tall. Their register letters are:—

D D D E E E e F F f f G H H H H H H J J k L l m m N

It will thence be noted that the dolichocephalic side is well represented amongst these tall people, and that dark colouring is not very common amongst them, at least as regards their eyes.

4. Among the same 69 men, 22 are short. Their register letters are:—

A b D d e e f F G G H j j j j k k K k l m p

There are thus 13 dark people among the 22 as against 7 among the 26. We may point out that these proportions of tall and short are very unusual in Wales.

Those are called tall whose height is above 1750 mm. (nearly 5 feet 9 inches), and they are distinctly few elsewhere in our two counties, as the accompanying tables show. Those are called short whose stature is less than 1675 mm. (about 5 feet 6 inches).

It is to be noted in the table that the only other district which shows a considerable frequency of tallness is that of Newcastle Emlyn, where, as has been said, the tall fair Nordic type occurs.

District.	Tall.	Short.	Number of cases.
Tregaron, etc.	23·5 per cent.	23·5 per cent. ¹	34
Newquay	11·1 „	50·0 „	18
Newcastle Emlyn, etc. ...	28·6 „	33·3 „	21
Llandyssul, etc.	13·8 „	39·7 „	58
Denbigh moorland	19·6 „	47·0 „	51
Bala, Llanuwchllyn	37·7 „	31·9 „	69

We thus identify a tall type as being characteristic of this cleft: it is not distinctly dark; in fact, in most of the places named, dark colouring most often goes with short stature. For all that, it cannot be identified as fair, nor can it be identified completely with the Roman-nosed type.

The most marked types issuing from this region are perhaps the fair, medium to broad-headed men with "Roman" noses, and usually a well-marked brow ridge. They are sufficiently distinct to be recognized by other Welshmen as belonging to this district, and hardly any other district is known to show them in any numbers. They represent, at any rate, an aggregation of those characters which are notably distinctive of the district (Plate III, 2A, 2B; Plate IV, 2).

It will be useful to give a detailed list of observations in one typical case:—

Skin fresh, eye light grey, hair light brown, slightly on the scarce side of medium as regards quantity. Face broad but not heavy jawed. Ear distinctly large. Head length (max. ant.-post. diameter) 201, max. breadth 164, bizygomatic breadth 140, bigonal breadth (angles of lower jaw) 116, auriculo-nasal radius 88, auriculo-alveolar radius 84, head circumference 583, stature 1770 mm. Length of arm (to tip of middle finger) 775 mm. Length of leg 917 mm. Cephalic index 81·6. The height of the head was notable, though we did not take it as we find this an unsatisfactory measurement on living heads under our conditions of work.

¹ Three other men in our table all have this measurement exactly on the 1675 limit, so this figure should really be higher in order to give a true idea of the population.

As regards dimensions of the head, this gentleman is above the normal, the length and breadth respectively being more often in the neighbourhood of 190 and 155.

It is difficult to make useful comparisons between modern heads and prehistoric crania, but it may not be amiss to note that the Cowlam skull¹, though rather shorter and broader, may not have been unlike this type in general character. It is markedly distinct from those brachycephalic skulls, bearing every mark of savagery, which have been considered too often to be the one and only "Bronze Age Type." That term is fortunately giving place to the term, "Type of the Beaker Makers." It is permissible to suppose that the course of life in 4000 years has softened these rugged features and that our type is descended fairly directly from that one.

The rugged-browed platycephalic type is not one which we have found among our brachycephalic people, but strength of brow, large size of skull and brachycephaly associated with the strong development of the nose above mentioned and with tall stature are certainly characteristic of Merionethshire, and especially of the great cleft which reaches the sea at Towyn.

We incline to look upon these brachycephals as, then, in some degree analogous with, and hence possibly related to, some of the types known as the Bronze Age invaders of Britain, the types which Abercromby² associates with his "Bronze Age Pottery." It would be better to refer to Beakers, and not to use the term Bronze Age, as it is increasingly believed that these people were not the bringers of Bronze.³

Abercromby shows that his potters occupied chiefly open country, but we note for future reference that they did not make much impression in Cornwall. Abercromby supposes that this was because of extreme wetness of the climate, but we shall later on draw attention to another hypothesis, noting meanwhile that he allows Cornwall to have been touched after 1500 B.C. (his date for the ultimate fusion of his potters with the indigenous population) by invaders, who made broad-handled pottery of Armorican type.

It has already been shown that the proportion of dark brachycephals is unusually high in the Ardudwy region, in which we include the coast between the Mawddach estuary and Criccieth, and into which we incorporate the vale of Ffestiniog, though we do this last with misgivings, and only because we find it difficult to fix a dividing line otherwise.

In this region we have 113 registers on our map, and these can be classed as follows:—

¹ Greenwell and Rolleston, *British Barrows*, 1877, p. 587.

² Abercromby, J., *Bronze Age Pottery*, 1912, pp. 64, 110, etc.

³ It must be remembered that men of this type may have been present, especially perhaps among the leaders, in immigrant groups subsequent to the group discussed by Abercromby. This point is sometimes overlooked in discussions of this, and of other, types.

	Letter.	Dark hair, and eyes.	Dark hair, light eyes.	Light hair and eyes.
Cephalic index under 73 ...	a	1	0	0
73—73·9 ...	b	0	1	1
74—74·9 ...	d	2	3	0
75—75·9 ...	e	7	2	2
76—76·9 ...	f	4	1	1
77—77·9 ...	g	10	2	3
78—78·9 ...	h	4	4	1
79—79·9 ...	j	8	4	0
80—80·9 ...	k	2	6	7
81—81·9 ...	l	7	2	0
82—82·9 ...	m	6	2	0
83—83·9 ...	n	2	3	3
84 and above...	p	6	1	0

Also two red-haired men with indices below 79 and two with indices above 80, and one man with the anomalous combination of dark eyes and light hair.

With the broad darks forming 18·6 per cent. of the sample (index 81 and above), and the narrow darks (under 76·0) only 8·8 per cent. (15·8 per cent. in North Cardiganshire; 13·0 per cent. in Cardiganshire generally), the character of the population is seen to be definitely marked. Fair types are scarce as well.

We have already noticed the same fact of preponderance of broad darks, on a small scale, at Newquay on the Cardiganshire map. Our general observations have shown us that it is characteristic of the Pencaer district of North Pembrokeshire, and we shall find other examples of this elsewhere. Now in each of these three cases we are dealing with places on the coastal fringe of a moorland which was almost certainly open country in prehistoric times. There would thus seem to be something supplementary to be added to our general statement about such open country and its population.

If the dark dolichocephals were found here in anything like the proportion in which they occur around the moorlands a little way in from the coast (see analyses of Llandyssul table) we should be inclined to wonder whether our broad darks were not merely the broader variants of the ordinary dark type of dolichocephal, but our distributional study seems to point to their being a distinct type. They are distinct also in that their frames are more stalwart; their stature, while very variable, is occasionally quite tall. It might be suggested that they are a variant which has arisen after the fashion in which Boas supposes types to change, but, in our general conclusions, we think it will be possible to offer an alternative hypothesis for the consideration of archaeologists and anthropologists. Briefly, we think we have here traces of settlements of coastal wanderers, and we propose to examine and develop this view after considering other regions.

A few words should be added concerning the sample from the vale of Ffestiniog. Here, owing to movements in recent years in connection with the slate quarries, it is not possible to be quite sure of the indigenous character of the sample, but we note that of the 28 people entered on the map, 13 are dark dolichocephals, a considerable proportion. There are 5 distinctly brachycephalic people (index 81 or over), and the district shows no fair types with index below 80. The district shows a characteristic "Neolithic" element appropriate near the moorlands to the north, and also appropriate to a more or less industrialized place, for this is the type which seems to resist the dangers of industrialism most effectively. Mixed with this is the brachycephalic element so characteristic of the remainder of the county. A noteworthy feature is that not one of our 27 is tall, while 16 of the 27 are distinctly short.

This feature is generally known, and it is stated in the district that the bones of the people are small and set only with difficulty after a breakage. This is locally ascribed either to the extraordinary rainfall or to the absence of lime in this slaty district with water probably containing humic acids. We cannot do more at present than note these suggestions without comment, save that we think the industrialization of the district and its present poverty are cardinal facts.

TABLE 12.—THE GREAT CLEFT AND ITS BRANCHES.

Clarendon type = convex nose profile.

NOTE.—Clarendon type is used, for convenience of printing, in place of the underlining employed on the map of Merionethshire (Fig. 2, *q.v.*).

Number and region.	Cephalic index.	Head length.	Head breadth.	Stature.	Map letter.	Age.
1. Llandrillo	72·2	198	143	1645	<i>A</i>	62
2. Towyn	72·8	206	150	1735	<i>a</i>	adult
3. Bala and Cynwyd	73·0	199	146	1740	<i>b</i>	28
4. Dolgelly	73·1	193	141	1615	<i>B</i>	31
5. Talylyn	73·1	201	147	1705	<i>B</i>	63
6. Bala and Llanuwchllyn	73·8	187	138	1620	<i>b</i>	63
7. Bala	74·0	192	142	1600	<i>d</i>	42
8. Dolgelly and Trawsfynydd	74·1	201	149	1745	<i>d</i>	adult
9. Bala and Cerrig-y-druidion	74·5	200	149	1830	<i>D</i>	40
10. Bala and Llanuwchllyn	74·5	200	149	1805	<i>D</i>	41
11. Corwen and Llandrillo	74·5	192	143	1805	<i>D</i>	33
12. Towyn	74·6	197	147	1730	<i>D</i>	adult
13. Towyn	74·7	202	151	1690	<i>r</i>	53
14. Bala and Llanuwchllyn	74·8	195	146	1640	<i>D</i>	22
15. Dolgelly	74·9	193	143	1675	<i>d</i>	20

TABLE 12.—THE GREAT CLEFT AND ITS BRANCHES—*continued.*

Number and region.	Cephalic index.	Head length.	Head breadth.	Stature.	Map letter.	Age.
16. Dolgelly	75·0	200	151	1780	E	20
17. Dolgelly	75·1	193	145	1555	x	32
18. Arthog and Cleft	75·3	203	153	1905	E	adult
19. Dolgelly	75·5	192	145	1605	E	60
20. Towyn and coast	75·5	200	151	1780	E	20
21. Bala	75·5	212	160	1830	E	58
22. Bala	75·6	193	146	1500	e	25
23. Bala	75·6	197	149	1880	E	47
24. Cynwyd, etc.	75·6	201	152	1740	e	28
25. Cynwyd, etc.	75·6	197	149	1600	e	adult
26. Dolgelly	75·7	206	156	1695	e	55
27. Dolgelly	75·8	203	154	1665	e	52
28. Dolgelly and Bala	75·8	207	157	1760	e	46
29. Llanuwchllyn	75·8	203	154	1785	E	45
30. Bala	75·9	195	148	1680	E	36
31. Bala	76·0	200	152	1720	F	21
32. Dolgelly	76·0	200	152	1665	F	adult
33. Aberdyfi, etc.	76·1	192	146	1645	f	39
34. Dolgelly and Bala	76·3	198	151	1680	F	33
35. Llanuwchllyn	76·3	198	151	1755	f	adult
36. Dolgelly	76·3	198	151	1600	F	26
37. Dolgelly and Bala	76·4	195	149	1825	F	24
38. Dolgelly	76·4	203	155	1835	F	34
39. Llanuwchllyn	76·4	191	146	1600	F	37
40. Brynecrug	76·4	199	152	1620	F	44
41. Towyn	76·5	200	153	1570	F	57
42. Bala	76·5	183	140	1740	f	40
43. Bala and Cerrig-y-druidion	76·5	200	153	1670	f	20
44. Upper Mawddach	76·5	179	137	1650	F	58
45. Dee Valley	76·5	196	150	1675	x	42
46. Towyn	76·6	192	147	1570	r	60
47. Dolgelly	76·6	192	147	1610	r	22
48. Dolgelly	76·6	184	141	1655	F	adult
49. Llanuwchllyn	76·7	197	151	1780	F	22
50. Towyn	76·7	193	148	1655	F	49
51. Aberdyfi, etc.	76·8	190	146	1640	f	adult
52. Bala	76·8	207	159	1775	f	35
53. Towyn	76·8	198	152	1710	f	34
54. Bala and Dolgelly	76·9	199	153	1710	f	40

TABLE 12.—THE GREAT CLEFT AND ITS BRANCHES—*continued.*

Number and region.	Cephalic index.	Head length.	Head breadth.	Stature.	Map letter.	Age.
55. Bala	77·2	193	149	1710	<i>G</i>	21
56. Upper Mawddach	77·2	197	152	1725	<i>g</i>	adult
57. Bala and Llanuwchllyn	77·3	189	146	1605	G	54
58. Talyllyn	77·3	194	150	1690	G	52
59. Bala and Cerrig-y-druidion	77·6	187	145	1615	G	20
60. Bala	77·7	193	150	1750	<i>G</i>	28
61. Towyn	77·8	194	151	1645	G	54
62. Dolgelly	77·8	194	151	1685	<i>g</i>	56
63. Dolgelly	77·9	190	148	1635	<i>G</i>	29
64. Towyn	77·9	199	154	1700	<i>G</i>	44
65. Dolgelly	77·9	195	152	1670	<i>G</i>	42
66. Llanegryn	78·0	200	156	1790	<i>H</i>	adult
67. Llanuwchllyn	78·2	188	147	1600	H	43
68. Dolgelly	78·2	193	151	1675	h	adult
69. Bala, etc.	78·3	203	159	1695	H	33
70. Bala	78·4	204	160	1790	<i>H</i>	52
71. Aberdyfi and Towyn	78·4	208	163	1750	h	adult
72. Bala	78·5	200	157	1750	<i>H</i>	50
73. Llanuwchllyn	78·5	186	146	1785	H	32
74. Towyn and Dolgelly	78·5	191	150	1590	<i>H</i>	52
75. Llanuwchllyn and Bala	78·6	192	151	1780	<i>H</i>	45
76. Bala	78·6	201	158	1785	<i>H</i>	48
77. Towyn	78·6	196	154	1705	<i>h</i>	30
78. Dolgelly	78·6	196	154	1725	<i>h</i>	adult
79. Dolgelly	78·8	193	152	1620	<i>h</i>	49
80. Corwen	78·8	194	153	1725	<i>H</i>	45
81. Towyn	78·8	193	152	1675	<i>H</i>	19
82. Bala	78·9	189	149	1645	<i>h</i>	52
83. Dolgelly, etc.	78·9	185	146	1770	<i>H</i>	21
84. Bala and Corwen... ..	79·1	201	159	1800	J	adult
85. Bala, etc.	79·2	187	148	1805	<i>J</i>	20
86. Bala and Corwen... ..	79·3	188	149	1675	<i>J</i>	24
87. Bala, etc.	79·3	184	146	1605	J	64
88. Dolgelly, Corris	79·3	184	146	1695	J	adult
89. Towyn, etc.	79·3	193	153	1655	<i>j</i>	21
90. Dolgelly, etc.	79·3	193	153	1705	<i>J</i>	57
91. Upper Mawddach	79·4	189	150	1550	<i>j</i>	25
92. Talyllyn	79·4	189	150	1525	<i>J</i>	22
93. Bala, etc.	79·4	184	146	1610	j	29

TABLE 12.—THE GREAT CLEFT AND ITS BRANCHES—*continued.*

Number and region.	Cephalic index.	Head length.	Head breadth.	Stature.	Map letter.	Age.
94. Bala	79·5	185	147	1740	<i>J</i>	19
95. Dolgelly	79·6	186	148	1725	<i>j</i>	34
96. Dolgelly and Bala	79·6	186	148	1665	<i>j</i>	22
97. Dolgelly	79·7	187	149	1695	<i>J</i>	adult
98. Bala and Corwen... ..	79·7	182	145	1655	<i>J</i>	23
99. Dolgelly	79·8	188	150	1690	<i>j</i>	20
100. Trawsfynydd	79·8	198	158	1690	<i>J</i>	adult
101. Towyn	79·8	191	152	1610	<i>J</i>	40
102. Towyn, etc.	79·9	199	159	1770	R	44
103. Bala, etc.	80·1	186	149	not taken	<i>k</i>	19
104. Towyn, etc.	80·1	196	157	1790	<i>k</i>	adult
105. Dolgelly, Bala	80·1	191	153	1590	K	62
106. Dolgelly	80·1	186	149	1710	<i>k</i>	34
107. Bala	80·3	183	147	1630	k	26
108. Towyn	80·3	198	159	1655	K	adult
109. Llanuwchllyn	80·3	188	151	1580	K	42
110. Trawsfynydd	80·4	184	148	1630	K	54
111. Dolgelly, Bala	80·4	189	152	1670	<i>k</i>	27
112. Towyn	80·5	195	157	1575	<i>K</i>	56
113. Dolgelly	80·6	191	154	1820	R	21
114. Llanuwchllyn	80·7	192	155	1865	k	55
115. Bala	80·9	183	148	1670	K	52
116. Bala	81·1	191	155	1775	<i>l</i>	43
117. Towyn	81·2	192	156	1685	<i>L</i>	39
118. Bala	81·3	182	148	1680	L	58
119. Aberdovey	81·4	188	153	1700	L	adult
120. Llanuwchllyn	81·4	189	154	1675	<i>l</i>	29
121. Dolgelly	81·5	184	150	1650	L	42
122. Dolgelly and Llanuwchllyn	81·6	201	164	1770	L	40
123. Aberdovey	81·6	196	160	1630	<i>L</i>	adult
124. Bala	81·6	185	151	1640	<i>l</i>	49
125. Bala, etc.	81·9	193	158	1710	<i>l</i>	35
126. Dolgelly and Corris	82·0	189	155	1680	M	43
127. Bala	82·1	179	147	1625	<i>m</i>	49
128. Bala	82·1	190	156	1810	m	56
129. Aberdovey	82·2	202	166	1490	<i>M</i>	adult
130. Dolgelly and Bala	82·3	181	149	1680	m	47
131. Bala and Corwen... ..	82·3	187	154	1655	M	22

TABLE 12.—THE GREAT CLEFT AND ITS BRANCHES—*continued*.

Number and region.	Cephalic index.	Head length.	Head breadth.	Stature.	Map letter.	Age.
132. Bala	82·3	204	168	1775	<i>m</i>	38
133. Dolgelly and Machynlleth ...	82·4	176	145	1655	<i>M</i>	adult
134. Trawsfynydd	82·9	193	160	1560	<i>M</i>	adult
135. Dolgelly	83·2	190	158	1660	<i>n</i>	56
136. Llanuwchllyn	83·5	188	157	1760	<i>N</i>	21
137. Bala	84·7	203	172	1670	<i>p</i>	55
138. Dolgelly and Llanuwchllyn ...	84·9	185	157	1675	<i>P</i>	23

TABLE 13.—ARDUDWY, ETC.

Those from Vale of Ffestiniog marked *

Clarendon type = convex nose-profile.

No.	Cephalic index.	Head length.	Head breadth.	Stature.	Map letter.	Age.
1	72·9	199	145	1720	a	21
2	73·6	197	145	1690	B	28
3	73·9	203	150	1670	<i>B</i>	adult
4	74·1	201	149	1720	<i>D</i>	adult
5	74·3	202	150	1630	d	36
6	74·4	195	145	1730	<i>D</i> *	adult
7	74·5	204	152	1720	<i>D</i>	adult
8	74·9	207	155	1670	<i>d</i> *	adult
9	75·1	193	145	1650	e	25
10	75·4	199	150	1645	<i>e</i>	adult
11	75·4	187	141	1655	<i>e</i> *	35
12	75·6	197	149	1700	<i>e</i>	adult
13	75·6	205	155	1720	e	adult
14	75·7	193	146	1630	<i>e</i> *	19
15	75·7	193	146	1650	<i>E</i>	30
16	75·7	193	146	1640	<i>E</i>	22
17	75·7	193	146	1690	<i>E</i>	adult
18	75·9	195	148	1730	<i>e</i>	adult
19	75·9	195	148	1660	<i>E</i> *	60
20	76·1	197	150	1675	<i>f</i> *	45
21	76·1	194	149	1670	<i>f</i>	adult
22	76·1	197	150	1735	<i>r</i> *	26

TABLE 13.—ARDUDWY, ETC.—*continued.*

No.	Cephalic index.	Head length.	Head breadth.	Stature.	Map letter.	Age.
23	76·2	193	147	1670	F	21
24	76·5	196	150	1655	<i>F</i>	adult
25	76·7	189	145	1630	f*	33
26	76·7	197	151	1720	r	42
27	76·9	195	150	1715	f	25
28	77·1	188	145	1630	G	40
29	77·2	197	152	1730	g	22
30	77·2	193	149	1635	g	46
31	77·2	193	149	1600	g*	adult
32	77·3	198	153	1680	G	24
33	77·3	198	153	1695	g	21
34	77·4	199	154	1640	G	adult
35	77·4	190	147	1630	g*	25
36	77·5	196	152	1690	g *	adult
37	77·6	187	145	1610	G*	adult
38	77·7	197	153	1700	G	65
39	77·7	188	146	1640	g *	63
40	77·8	194	151	1660	g*	26
41	77·8	194	151	1795	g	46
42	77·8	194	151	1700	g	adult
43	78·0	191	149	1670	H	adult
44	78·0	196	153	1645	H	58
45	78·0	200	156	1765	H	adult
46	78·1	206	161	1675	h	26
47	78·1	192	150	1635	h	37
48	78·2	197	154	1695	H	56
49	78·3	198	155	1680	h*	40
50	78·7	188	148	1670	H*	50
51	78·9	204	161	1720	h	21
52	79·2	188	149	1675	J	40
53	79·3	193	153	1745	j	34
54	79·3	193	153	1660	j	adult
55	79·4	194	154	1665	J	22
56	79·5	190	151	1655	j*	40
57	79·5	195	155	1655	j*	35
58	79·6	191	152	1675	J	adult
59	79·6	196	156	1590	j	42
60	79·6	191	152	1720	j	adult
61	79·7	192	153	1710	J	adult
62	79·7	197	157	1795	j	22

TABLE 13—ARDUDWY, ETC.—*continued.*

No.	Cephalic index.	Head length.	Head breadth.	Stature.	Map letter.	Age.
63	79.7	192	153	1630	j*	59
64	80.0	190	152	1620	K	22
65	80.0	185	148	1725	k	34
66	80.1	191	153	1560	K	adult
67	80.1	191	153	1595	K	adult
68	80.2	187	150	1710	K*	adult
69	80.2	187	150	1530	K	45
70	80.3	193	155	1760	K	adult
71	80.4	184	148	1670	K*	27
72	80.4	199	160	1640	K*	adult
73	80.5	195	157	1660	k	31
74	80.6	186	150	1695	x*	24
75	80.6	191	154	1590	K	40
76	80.8	187	151	1650	K	26
77	80.8	198	160	1685	K*	36
78	80.9	183	148	1700	K	30
79	80.9	189	153	1760	K	20
80	81.0	190	154	1715	l	33
81	81.0	195	158	1640	l	adult
82	81.1	191	155	1620	L	40
83	81.3	187	152	1710	l	30
84	81.4	193	157	not taken	l	adult
85	81.4	189	154	1680	R	adult
86	81.4	177	144	1565	l*	49
87	81.6	191	156	1680	l	adult
88	81.6	196	160	1690	l	28
89	81.9	194	159	1775	L	38
90	82.0	189	156	1765	m	19
91	82.1	196	161	1725	m	adult
92	82.3	186	153	1620	R	adult
93	82.7	185	153	1650	M*	adult
94	82.7	191	158	1645	m	33
95	82.7	191	158	1705	m	19
96	82.7	191	158	1620	m	adult
97	82.8	174	144	1690	M	24
98	82.9	181	150	1665	m	21
99	83.1	189	157	1645	N	36
100	83.3	192	160	1730	N*	55
101	83.3	198	165	1680	N	adult
102	83.3	192	161	1610	N*	65

TABLE 13.—ARDUDWY, ETC.—*continued*.

No.	Cephalic index.	Head length.	Head breadth.	Stature.	Map letter.	Age.
103	83·6	195	163	1680	N	26
104	83·6	183	153	1570	n	adult
105	83·9	199	167	1660	n	51
106	83·9	186	156	1705	N	45
107	84·0	188	158	1680	p	adult
108	84·0	187	157	1665	p	adult
109	84·1	189	159	1730	p	adult
110	84·6	188	159	1705	p*	19
111	85·1	188	160	1655	p	62
112	85·3	184	157	1645	p	50
113	85·8	190	163	1640	P	adult

MERIONETHSHIRE.

The table for Merionethshire as a whole does not call for comment beyond that which it has received above, but its numbers will be found useful for comparison with those given for Cardiganshire. In order to get as large numbers as possible we have included, not only those registered on the map, but also others whose ancestry connected them with parts of the county too widely separated to permit of our fixing on one place on the map for registration.

Cephalic index.	Map letter.	Black hair, brown eyes.	Dark or medium brown hair, brown eyes.	Dark or medium brown hair, light eyes.	Fair.	Red.	Light hair, dark eyes.	Total.
Under 73 ...	a	2	1	2	0	0	0	5
73 to 73·9 ...	b	0	2	3	2	0	0	7
74 to 74·9 ...	d	3	7	6	5	1	0	22
75 to 75·9 ...	e	5	12	12	6	0	1	36
76 to 76·9 ...	f	4	12	14	8	4	2	44
77 to 77·9 ...	g	6	10	12	5	0	0	33
78 to 78·9 ...	h	0	12	17	6	0	0	35
79 to 79·9 ...	j	7	12	19	6	1	0	45
80 to 80·9 ...	k	3	7	13	10	3	2	38
81 to 81·9 ...	l	4	9	5	4	1	0	23
82 to 82·9 ...	m	3	7	5	3	1	0	19
83 to 83·9 ...	n	1	3	6	3	0	0	13
84 and above	p	2	5	2	0	0	0	9
		40	99	116	58	11	5	329

NOTES ON OTHER SAMPLES FROM NORTH WALES.

I.—From Carnarvon and Anglesey we have up to the present only about seventy-two cards, and, scattered over such an area, they allow us little opportunity for drawing conclusions. This area seemed to us to be unsuitable for a first study, because its stirring history must have implied much intermixture at times remote beyond all chance of tracing out. Anglesey has been a sacred centre, has been the goal of metal-seekers, and has suffered much from sea-raiders. Carnarvon and Conway at once suggest interferences from without, and Carnarvonshire is largely composed of passes through the mountains. Though Carnarvonshire has been the great refuge, it has not that (human) isolation which is so characteristic of Merionethshire and Cardiganshire.

We note, however, a few points without wishing to emphasize them:—

1. The more marked forms of dolichocephaly do not occur among our sample and have not been noticed by us in the population.
2. The fairly average Mediterranean type is reasonably abundant and generally distributed, as our cards show. Direct observation seems to indicate the importance of Nevin as a centre for this type.
3. The pure dark types do not seem to be common in Anglesey. This is what one would expect from a consideration of the ways in which Anglesey must have been affected from the sea and by East Ireland, etc.
4. There appears to be a moderate sprinkling of quite broad heads, frequently accompanied by dark hair, in the district south of Carnarvon (*i.e.* Clynnog, Llanllyfni, etc.) and in Anglesey. (*Cf.* Ardudwy Coast, Newquay, Pencaer Pem., Llantwit Major, and so on.) In Anglesey, and perhaps elsewhere, the broad-headed dark type has a variety with long face and pointed chin.
5. There is somewhat more than the usual proportion of red hair in the county. No red-haired person measured here has an index below 75, and the maximum number of reds, as of fair types, falls between the indices 77 and 79 or 80.

II.—The northern part of the English border is another district which we have not worked in detail at this stage of our research, for here again was bound to occur intimate admixture of old standing and great complexity. We happen to have, nevertheless, about twenty-one cards for people from various parts of the fall line which runs from the Irish Sea coast of Flintshire to the emergence of the Dee from its deep valley on to the plain. A point of some interest is noticeable among these few cards. There are six of the twenty-one who have decidedly broad heads (index 81 or above), and they come one and all from the region where the Dee emerges. Two of them are fair but short, three are dark (two short and one tall), one is short and has dark hair and light eyes. As we have already drawn attention to the importance of broad heads in the great Merionethshire cleft, we have thought this worth noting for future inquiry. None of these broad heads

has the straight nose ; it is usually broad, and in two at least prominent and convexly curved or angulated. The notes given under this heading are naturally not of great consequence, but may be of use in the future, and in the meantime the cards are being preserved (see also below, p. 106). We think there is a strong element of the Mediterranean stock in the hill population of Flint, as in that of Denbigh (see above, pp. 67-69).

WESTERN MONTGOMERYSHIRE.

(See Table 14, p. 102, also Figs. 3-5.)

The county of Montgomeryshire is essentially the upper portion of the Severn System, and as such it is fairly open eastwards—*i.e.*, towards the English plain. The openings in this direction, as present circumstances go, are four in number. There is the way of the Severn itself, past Llan-y-mynech—a good line of railway connection, but one which was very swampy, no doubt, in former times. The way of Westbury is also used by the railway, but was difficult in earlier times, because the narrow valley is so dominated by the Breidden Hills and the Long Mountain, its fortified flanking hills. The Minsterley Valley is very swampy. The Montgomery, Bishop's Castle, Ludlow route for modern purposes has the disadvantage of a considerable rise, but this makes it dry, and in the Middle Ages it was without doubt an all-important route, as the town names just mentioned testify.

If we go back beyond the days of valley connections we find that, whereas the forest and swamp of the Dee basin on the north, and that of the lower Severn basin on the south, must have been important barriers, the Longmynd, Long Mountain, Caer Caradoc, Wenlock Edge, the Brown Clee Hills, etc., made a line of partially open country which probably permitted connection between the Birmingham plateau and Cannock Chase and what is now Montgomeryshire. Montgomeryshire has thus at all times been peculiarly open to penetration from the east, peaceful penetration as well as armed invasion.

Westward and north-westward in the county we get up among the feeders of the Severn that run deep between the moorland hills of the spreading Welsh plateau. The Severn itself comes from Plynlymon past Llanidloes, while the Carno meets the Severn below Llanidloes at Caersws. At the back, therefore, is the Plynlymon country already discussed, while across the watershed at the source of the Carno we get into the torrent valleys that have made deep ravines in the edge of the great plateau ; this is the wild country of the Dyfi System. The authority of Montgomeryshire has spread from antiquity up and through the pass at the head of the Carno, and has controlled that pass right away down to the focus at its western end, the town of Machynlleth.

We have, therefore, on all grounds considered the Dyfi valley people along with those of the valleys of Severn and Carno as far down as Llanidloes and Caersws. We do this the more freely because the Dyfi estuary has probably not been a region of entry to any extent. It has such large stretches of bog and of

sand, and its northern shore is so difficult, that one cannot imagine it being used as the Teifi, for example, may have been.

The numbers of narrow-headed men is one of the first points to be noted.

The average cephalic index for the 100 cases is 77.1 as against 78.0 for 1850 Welshmen from all parts.

The number of people with index below 73 is 9—a remarkable figure—for this 9 per cent., while exceeded by the figure (14.8 per cent.) for the adjacent Plynlymon moorland and that (9.8 per cent.) for the Denbighshire upland, compares with the following :—

North Cardiganshire generally	...	...	...	5.3 per cent.
Central Cardiganshire	...	...	...	2.2 "
South Cardiganshire	...	...	...	1.7 "
Cardiganshire generally	...	...	...	2.6 "
The Cleft in Merionethshire	...	...	...	1.4 "
Ardudwy	...	...	...	0.9 "
Merionethshire generally	...	...	...	1.5 "

In the case of the district we are now considering it seems fairly evident that the importance of extreme dolichocephaly is associated with influences from the Plynlymon moorland, which has doubtless exported men gradually at most periods.

The persons with dark colouring and indices of 81.0 or above only number 2 amongst our 100. This percentage compares with the following :—

North Cardiganshire	...	...	...	4.5 per cent.
Cardiganshire	...	...	...	5.8 "
Merionethshire	...	...	...	10.3 "
Ardudwy	...	...	...	18.6 "

The "broad dark" type is thus conspicuously scarce here.

Broad heads generally are rather uncommon, 9 per cent. for this district, comparing with about 13.2 per cent. for Cardiganshire and 19.4 per cent. for Merionethshire.

More important still is the unusual scarcity of people with black hair and dark eyes : only 4 out of the 100 show this character. This compares with :—

Merionethshire	...	...	...	12.2 per cent.
Denbighshire upland	...	...	...	19.6 "
Cardiganshire	...	...	...	11.1 "
Wales generally	...	...	...	10.4 "

A supplementary fact here is that the people with dark hair and light eyes are almost as numerous as those with both eyes and hair brown or black. The numbers are 32 against 34 in 100. Compared with this we have the figures 28.1 per cent. against 41.8 per cent. in Cardiganshire and 35.2 per cent. against

42.2 per cent. in Merionethshire generally, 27.4 per cent. against 52.2 in Ardudwy and 37.7 per cent. against 36.2 per cent. in the great Merionethshire Cleft. Only the last-named district thus has more of the "dark and light" type, and that was found to be a district with a characteristic blond strain. We interpret the facts noticed at Llanidloes as pointing to the influence of the blond stock, which is extremely important and abundant near the English border. In fact, one's general impression from a study of Llanidloes men is that we have here a region where the "Mediterranean race" character is diluted with blond elements. This impression, gained independently from the cards and from direct observation, is very clear.

The red-haired people, standing at 8 per cent., do not call for special comment. This is slightly above the average, but we are near Plynlymon, which has been seen to be almost a nest of reds. The people with the anomalous combination of light hair and brown eyes are 7 among our 100. This is an unusually high figure, which probably points to much crossing.

Llanidloes is an old market town to which are brought the sheep from the moorlands round Plynlymon, and here, therefore, incoming influences belonging to the Severn have met the moorland influences, and we get the one type diluted by constant intermixture with the other.

It is noteworthy at the same time that the average stature for our 100 cases is about 1662 mm. and for the 39 cases in the Dyfi region 1655 mm. Both these figures are well under average (general average 1695-1700 mm.). Sixty of our 100, or 25 of the 39, are distinctly short (below 1675 mm.), while only 3 (none of them from the Dyfi region) are distinctly tall (above 1750 mm.).

Here again, as in the Ffestiniog region, we seem to have prevalent lowness of stature, much below that noted for the Llandyssul region, for example (approximately 1700 mm.), with 23 out of the 58 (39.7 per cent.) short and 8 (13.8 per cent.) tall. The Denbighshire upland, again, has an approximately average stature for the 50 samples we have taken, but among them 24 (*i.e.*, 48 per cent.) are short and 10 (*i.e.*, 20 per cent.) are tall. Of the 10 just mentioned 6 are dark and none of the other 4 is pure fair. This hints that there are tall, dark (mostly dolichocephalic) men in North Wales, a type well known from general observation, and one which our study of Western Montgomeryshire would show does not materially affect the population so far south.

We consider this tall, dark dolichocephal to be a type found in the ancient kingdom of Gwynedd (mainly Carnarvonshire, Merionethshire and Denbighshire), and think him rather distinct from the typical Mediterranean of South and West Wales, who is somewhat shorter.

The similarity between our Western Montgomeryshire region (and especially the Dyfi valley) and Ffestiniog and its vale in the matter of stature should be considered by those interested as possibly correlated with the heavy rainfall and the dire scarcity of lime in the two districts, as also with their hard conditions of life. One does see tall men at Machynlleth, but it will often be found that they or their recent ancestors are immigrants, often from Merionethshire.

ANALYSIS FOR WESTERN MONTGOMERYSHIRE.

Cephalic index.	Map letter.	Black hair, dark eyes.	Dark hair (not black), brown eyes.	Medium or dark hair, light eyes.	Fair.	Red.	Light hair, dark eyes.	Total.
Under 72 ...	a	1	1	0	1	0	0	3
72 ...	a	0	4	1	1	0	0	6
73 ...	b	1	1	1	0	1	0	4
74 ...	d	0	1	1	3	0	2	7
75 ...	e	0	1	3	3	2	0	9
76 ...	f	0	2	5	3	1	2	13
77 ...	g	2	6	5	0	0	2	15
78 ...	h	0	10	6	1	0	0	17
79 ...	j	0	2	5	5	1	1	14
80 ...	k	0	0	1	0	2	0	3
81 ...	l	0	0	2	1	1	0	4
82 ...	m	0	0	0	1	0	0	1
83 ...	n	0	2	1	0	0	0	3
84 and over	p	0	0	1	0	0	0	1
	Totals ...	4	30	32	19	8	7	100

TABLE 14.—WESTERN MONTGOMERYSHIRE.

Those who belong to the mountain district or to the Dyfi valley are marked by an asterisk.

No.	Cephalic index.	Head length.	Head breadth.	Stature.	Map letter.	Age.
1	67·0	194	130	1600	a*	adult
2	70·7	205	145	1675	a	27
3	70·7	189	134	1620	A	24
4	72·3	199	144	1605	a	adult
5	72·3	195	141	1735	A	20
6	72·4	196	142	1785	a	adult
7	72·8	202	147	1645	a	adult
8	72·9	196	143	1665	A	31
9	72·9	188	137	1695	a*	adult
10	73·0	204	149	1710	r*	56
11	73·1	201	147	1655	B	33
12	73·8	191	141	1670	δ*	30

TABLE 14.—WESTERN MONTGOMERYSHIRE—*continued.*

No.	Cephalic index.	Head length.	Head breadth.	Stature.	Map letter.	Age.
13	73·8	191	141	1640	b	39
14	74·0	200	148	1680	d*	adult
15	74·1	185	137	1640	D	19
16	74·2	194	144	1685	x	21
17	74·2	190	141	1545	D	31
18	74·2	190	141	1670	D	31
19	74·6	193	144	1665	x	20
20	74·7	194	145	1630	D*	adult
21	75·0	200	150	1600	r	40
22	75·0	196	147	1665	E	adult
23	75·0	196	147	1715	e	43
24	75·0	196	147	1725	E	35
25	75·4	199	150	1700	r*	20
26	75·4	199	150	1555	E	25
27	75·5	208	157	1850	E	32
28	75·5	192	145	1675	E	55
29	75·9	195	148	1590	E*	adult
30	76·0	196	149	1730	x	19
31	76·0	179	136	1615	F	25
32	76·1	180	137	1650	F	39
33	76·2	193	147	1620	x*	adult
34	76·2	193	147	1630	F	adult
35	76·2	193	147	1560	f	32
36	76·3	190	145	1725	f	22
37	76·3	186	142	1560	r	32
38	76·5	179	137	1640	F*	adult
39	76·7	193	148	1675	F	23
40	76·7	197	151	1645	F	19
41	76·7	193	148	1815	F	40
42	76·9	195	150	1665	F	52
43	77·1	192	148	1640	G*	adult
44	77·1	179	138	1725	g*	20
45	77·1	201	155	1710	g	adult
46	77·2	197	152	1670	G*	24
47	77·3	198	153	1590	g*	adult
48	77·3	181	140	1640	G	29
49	77·4	186	144	1690	x	26
50	77·4	190	147	1625	G*	adult
51	77·4	199	154	1510	g	adult

f

TABLE 14.—WESTERN MONTGOMERYSHIRE—*continued.*

No.	Cephalic index.	Head length.	Head breadth.	Stature.	Map letter.	Age.
52	77·5	182	141	1600	<i>G</i>	35
53	77·6	192	149	1625	<i>g*</i>	26
54	77·7	193	150	1675	<i>x</i>	21
55	77·8	198	154	1715	<i>g</i>	38
56	77·9	190	148	1605	<i>g*</i>	adult
57	77·9	195	152	1745	<i>g</i>	22
58	78·0	186	145	1690	<i>h</i>	19
59	78·1	192	150	1730	<i>H*</i>	46
60	78·1	196	153	1660	<i>H*</i>	26
61	78·1	187	146	1635	<i>h*</i>	adult
62	78·3	194	152	1650	<i>h</i>	adult
63	78·3	184	144	1590	<i>h*</i>	19
64	78·3	203	159	1635	<i>h</i>	50
65	78·4	190	149	1720	<i>H*</i>	adult
66	78·4	185	145	1625	<i>H</i>	38
67	78·5	186	146	1665	<i>h</i>	21
68	78·7	193	152	1665	<i>h*</i>	adult
69	78·7	183	144	1590	<i>h</i>	25
70	78·8	184	145	1665	<i>H*</i>	adult
71	78·9	189	149	1560	<i>h*</i>	40
72	78·9	199	157	1740	<i>h*</i>	19
73	78·9	190	150	1625	<i>H</i>	37
74	78·9	199	157	1705	<i>H</i>	33
75	79·0	195	154	1720	<i>J</i>	39
76	79·1	191	151	1715	<i>J*</i>	22
77	79·2	192	152	1710	<i>J</i>	26
78	79·2	187	148	1625	<i>J</i>	30
79	79·2	187	148	1670	<i>J</i>	adult
80	79·3	193	153	1750	<i>j*</i>	adult
81	79·3	193	153	1700	<i>J*</i>	adult
82	79·5	190	151	1695	<i>J</i>	34
83	79·6	186	148	1620	<i>x*</i>	adult
84	79·6	196	156	1700	<i>J*</i>	40
85	79·7	192	153	1670	<i>R</i>	21
86	79·8	183	146	1575	<i>J*</i>	adult
87	79·8	183	146	1710	<i>J</i>	adult
88	79·9	194	155	1665	<i>j*</i>	adult
89	80·0	200	160	1600	<i>R*</i>	59
90	80·6	180	145	1635	<i>R*</i>	32

TABLE 14.—WESTERN MONTGOMERYSHIRE—*continued*.

No.	Cephalic index.	Head length.	Head breadth.	Stature.	Map letter.	Age.
91	80·8	193	156	1590	<i>K</i>	adult
92	81·0	190	154	1745	<i>L*</i>	21
93	81·0	190	154	1665	<i>R</i>	28
94	81·7	186	152	1560	<i>L*</i>	adult
95	81·9	193	158	1710	<i>L</i>	adult
96	82·9	193	160	1650	<i>M</i>	26
97	83·0	194	161	1665	<i>n*</i>	adult
98	83·2	190	158	1745	<i>N*</i>	20
99	83·4	193	161	1715	<i>n</i>	60
100	84·2	195	164	1675	<i>P</i>	30

N.B.—Some of those included in the above list are also on the Plynllymon list and on the list of the men with indices below 73.

TABLE 15.—NORTH MONTGOMERYSHIRE AND THE BERWYNS.

No.	Cephalic index.	Head length.	Head breadth.	Stature.	Map letter.	Age.
1	72·8	199	145	1725	<i>a</i>	adult
2	74·5	200	149	1710	<i>d</i>	adult
3	75·4	195	147	1625	<i>E</i>	22
4	75·6	201	152	1675	<i>E</i>	29
5	75·7	202	153	1865	<i>e</i>	25
6	76·1	197	150	1650	<i>e</i>	20
7	76·3	194	148	1620	<i>F</i>	65
8	77·2	197	152	1705	<i>G</i>	adult
9	78·2	193	151	1790	<i>h</i>	adult
10	79·3	193	153	1660	<i>x</i>	25
11	80·0	190	152	1725	<i>K</i>	24
12	81·0	185	150	1700	<i>l</i>	23
13	81·1	191	155	1670	<i>x</i>	20
14	81·4	189	154	1645	<i>R</i>	19
15	81·6	185	151	1690	<i>L</i>	adult
16	82·8	186	154	1640	<i>M</i>	26
17	86·0	193	166	1690	<i>P*</i>	adult
18	86·1	187	161	1625	<i>p</i>	30

NORTH MONTGOMERYSHIRE AND THE BERWYNS.

(See Table 15, p. 105.)

This difficult region of high plateau, cut by numerous streams which drain into the Severn and Dee along the Welsh border, has not been systematically worked at the present stage, but a few cards obtained draw attention to interesting details.

Most of these people belong to the little market towns of the valley junctions rather than to the high plateau itself, and it is interesting to notice that, of the 18, 8 have cephalic indices of 80 or above, while 7 have indices of 81 and above. In noticing the English border farther north, we found 6 out of the 21 samples had decidedly broad heads, and these all came from near the emergence of the Dee on the English plain (p. 99). We therefore link that observation with one made here, and draw attention to these tributary valleys of the Dee and the Severn in south-east Denbighshire and North Montgomeryshire as apparently possessing a broad-headed strain of some importance. We do not think that two small random assemblages (cards from people measured here and there, mostly outside this area) would be likely to show this character, the same in both cases, if there were not some general fact behind it. We believe that, as in the hill-country of Flint, so here also, we should find a fair proportion of the Mediterranean stock on the moorlands, but we imagine that so high and bleak a moorland would be only sparsely inhabited above natural forest-level in Neolithic times. The broad-headed element probably stands in some relation to that which is so characteristic of the great Merionethshire cleft, but at any rate the type of nose so noticeable there is found in only one (marked by an asterisk) in this region.

This problem of the broad heads is one which is very difficult to study in Wales alone, and it should be merely noted for purposes of comparison after more has been done for the ethnographical mapping of England.

THE MONTGOMERYSHIRE BORDER, RADNOR, AND BRECKNOCK.

These have not yet been dealt with systematically, as the problem here is undoubtedly one of comparatively recent admixtures with types across the border. The fair element in the population is reasonably well marked everywhere, and long-headedness is dominant, but there are large numbers of the Mediterranean stock. In fact, the border may be considered to have the same general character as that noted for West Montgomeryshire, but with less of the pure and extreme Mediterranean type and more of the markedly fair type. This last is especially noteworthy in Brecknock, where are found many tall, fair men, some with broad heads.

We look upon the Welsh basins of Severn and Wye as zones of penetration of medium-headed, well-built, fair types into Wales, but whether they can be said to represent the Ordovices, whose country they inhabit for the most part, or the Brythonic-speaking conquerors of Wales, is more than we could say. The question is discussed at greater length in a subsequent section.

CARMARTHENSHIRE.

(See Tables 16 and 17, pp. 108–112, and Figs. 2–5.)

Our work has not covered Carmarthenshire very completely, but we have filled about 200 cards in the county: 84 of these cards relate to people with ancestry entirely in the districts of the Rivers Gwendraeth and Loughor, chiefly in Pont-y-Berem, Cross Hands, Felinfoel and other villages near Llanelly; 53 cards relate to people who belong entirely to the Towy valley; and another 53 belong to the other parts of the county, a certain number coming from the region of the Taf and its feeders. It will be remembered that what is strictly the moorland region of the north and especially of the north-west of Carmarthenshire has been discussed in connection with South Cardiganshire, and has been said to possess an important element of the Mediterranean race type.

That type is present throughout the county, needless to say, but neither its purer nor its extreme types are common in the areas here studied. Only 3 among 190 (84+53+53) have dark hair and eyes and cephalic indices below 73 (*i.e.*, 1.6 per cent.), as against 5 among 114 (or 4.4 per cent.) in North Cardiganshire; 53 men among our 190 have eyes and hair dark and head indices under 80 (*i.e.*, 27.9 per cent.), as against 169 among 529 (or 31.9 per cent.) in Cardiganshire. This percentage difference is not very well marked, but when we come to the people with black hair and dark eyes and cephalic index below 80, we find only 8 among our 190 (*i.e.*, 4.2 per cent.). This compares with 8.2 per cent. (approximately) for Cardiganshire, but we must remember that the northern plateau of Carmarthenshire is treated with Cardiganshire. The corresponding figure for Denbigh and Flint is 12.1 per cent., for Merionethshire 8 per cent. approximately.

South Carmarthenshire may thus be said to show the Mediterranean type, but in a somewhat diluted form; we have many with light eyes, and the blacker as well as the more extreme long heads are rather scarce. The average height (about 1660 mm.) of these long heads of dark colouring in south-east Carmarthenshire is well under the general average for Mediterranean types in Wales (about 1690–1695 mm.). In fact, we are here dealing with the well-known South Wales or Silurian type, so important in the coal valley population of Glamorganshire and Monmouthshire.

The pure fair type is fairly well and generally represented, but its distribution does not call for special comment so far as our experience goes. The reds are a very important group, numbering 25 among our 190 cards. These reds are comparatively scarce in the Towy valley, numbering only 4 among 53, so that there are no less than 21 among the 137 others. This is 15.3 per cent. as against 7.3 per cent. for the county generally. In the Tregaron district we found a distinct red nest, likewise at Plynlymon. In the Carmarthenshire case it is more difficult to fix a locality. Some of the reds occur along the mountain roads across the hills from Tregaron, several come from the villages near Llanelly (13 per cent. of the local sample), and some belong to the Taf district. We should therefore

incline to state that the coast region of Carmarthenshire, and perhaps the west of the county as well, was to some extent a nest of reds, though not in so marked a degree as the other nests identified. The reds here might well be the result of long-continued crossing between the well-marked fair and dark elements. General observation supports the view that there is much redness in the Taf valley.

The broad heads (index 81 and above) number 17 among our 190 (*i.e.*, 8·9 per cent.), as against 11·1 per cent. for Cardiganshire and 14·7 per cent. for Merionethshire—*i.e.*, the number is rather low, but it is noteworthy that the small sample from the Towy valley has a considerable portion of broad heads; they number 7 among the 53 (*i.e.*, 13·2 per cent.). This is an indication which general observation confirms.

On the whole, therefore, we should say that, as might be expected from its extensive prehistoric moorlands, Carmarthenshire has a good foundation of Mediterranean stock, but this stock is much mixed with fair types, probably coming in coastwise or from the sea. There is a characteristic red type found round Llanelly, in the Taf valley and elsewhere, but it is rare in the Towy valley. This last region—a fertile vale which is also part of a long through-route through Wales—has a characteristic broad-headed element which is not found in any numbers in the rest of the county.

The very remote districts, such as the upper valleys around the Black Mountains—*e.g.*, near Llyn-y-fan-fach—would probably yield some extreme examples of dark, long-headed types, if systematically searched. One might even find the traces of possible Palæolithic character noted by us for Plynlymon.

TABLE 16.—TOWY VALLEY.

No.	Cephalic index.	Head length.	Head breadth.	Stature.	Map letter.	Age.
1	73·7	194	143	1730	<i>b</i>	20
2	74·0	200	148	1620	<i>d</i>	28
3	74·2	198	147	1685	<i>D</i>	20
4	74·2	198	147	1705	<i>D</i>	24
5	74·5	200	149	1715	<i>D</i>	24
6	74·6	197	147	1650	<i>x</i>	21
7	74·7	198	148	1665	<i>D</i>	40
8	74·7	202	151	1795	<i>D</i>	21
9	75·6	201	152	1725	<i>e</i>	23
10	75·9	191	145	1720	<i>E</i>	adult
11	75·9	195	148	1735	<i>e</i>	19
12	75·9	195	148	1755	<i>e</i>	27
13	76·0	204	155	1705	<i>F</i>	24
14	76·0	196	149	1645	<i>J</i>	22

TABLE 16.—TOWY VALLEY—*continued.*

No.	Cephalic index.	Head length.	Head breadth.	Stature.	Map letter.	Age.
15	76·2	202	154	1760	f	24
16	76·2	193	147	1725	f	21
17	76·3	190	145	1595	F	24
18	76·4	195	149	1600	F	53
19	76·8	190	146	1710	F	30
20	77·4	195	151	1700	r	21
21	77·4	199	154	1655	G	27
22	77·4	195	151	1590	G	25
23	77·9	190	148	1665	r	21
24	77·9	186	145	1680	g	26
25	78·2	183	143	1690	h	31
26	78·4	195	153	1745	h	24
27	78·6	196	154	1755	H	23
28	78·6	196	154	1640	H	65
29	78·8	194	153	1785	H	20
30	78·9	193	152	1650	h	34
31	78·9	193	152	1670	r	22
32	78·9	194	153	1705	H	24
33	78·9	194	153	1710	h	21
34	79·0	195	154	1620	J	20
35	79·1	196	155	1690	J	26
36	79·2	197	156	1695	j	19
37	79·2	192	152	1650	J	21
38	79·3	193	153	1670	J	19
39	79·3	193	153	1785	j	19
40	79·3	193	153	1680	J	26
41	79·7	197	157	1735	J	adult
42	80·2	197	158	1685	k	41
43	80·3	203	163	1780	k	19
44	80·6	196	158	1765	R	43
45	80·7	197	159	1735	K	19
46	80·8	193	156	1780	K	22
47	81·0	195	158	1670	L	50
48	81·4	188	153	1620	L	24
49	81·5	200	163	1635	L	45
50	81·6	201	164	1735	L	33
51	81·7	190	155	1550	x	adult
52	82·0	200	164	1690	m	40
53	83·9	186	156	1675	n	25

TABLE 17.—SOUTH-EAST CARMARTHENSHIRE.

(Pont-y-Berem, Cross Hands, Llanelly.)

No.	Cephalic index.	Head length.	Head breadth.	Stature.	Map letter.	Age.
1	70·8	199	141	1620	<i>a</i>	27
2	72·1	201	145	1695	<i>a</i>	21
3	72·4	203	147	not taken	<i>r</i>	adult
4	73·5	196	144	1650	<i>B</i>	30
5	73·7	194	143	1700	<i>B</i>	28
6	73·9	203	150	1640	<i>r</i>	20
7	73·9	203	150	1650	<i>B</i>	27
8	74·0	196	145	1600	<i>D</i>	24
9	74·0	186	135	1690	<i>D</i>	28
10	74·1	205	152	1680	<i>d</i>	20
11	74·1	201	149	1700	<i>D</i>	24
12	74·2	194	144	1705	<i>d</i>	35
13	74·3	191	142	1740	<i>d</i>	23
14	74·4	199	148	1640	<i>d</i>	35
15	74·9	203	152	1700	<i>D</i>	20
16	75·1	193	145	1600	<i>r</i>	36
17	75·1	195	146	1640	<i>x</i>	32
18	75·1	197	148	1600	<i>e</i>	32
19	75·1	201	151	1750	<i>E</i>	24
20	75·1	201	151	1610	<i>E</i>	46
21	75·1	201	151	1790	<i>E</i>	30
22	75·2	202	152	1665	<i>E</i>	38
23	75·5	200	151	1690	<i>x</i>	21
24	75·5	204	154	1650	<i>E</i>	24
25	75·5	196	148	1570	<i>E</i>	19
26	75·9	195	148	1630	<i>E</i>	adult
27	75·9	195	148	1700	<i>E</i>	21
28	75·9	195	148	1685	<i>e</i>	25
29	76·0	192	146	1685	<i>f</i>	adult
30	76·2	202	154	1700	<i>F</i>	27
31	76·2	193	147	1790	<i>F</i>	40
32	76·4	195	149	1620	<i>f</i>	33
33	76·5	204	156	1715	<i>F</i>	30
34	76·5	200	153	1700	<i>f</i>	55
35	76·6	201	154	1595	<i>f</i>	54
36	76·6	205	157	1615	<i>F</i>	22
37	76·9	195	150	1615	<i>F</i>	adult

TABLE 17.—SOUTH-EAST CARMARTHENSHIRE—*continued.*

No.	Cephalic index.	Head length.	Head breadth.	Stature.	Map letter.	Age.
38	77·0	200	154	1720	<i>G</i>	34
39	77·1	192	148	1725	<i>g</i>	23
40	77·1	199	154	1705	<i>G</i>	21
41	77·1	201	155	1710	<i>G</i>	27
42	77·2	197	152	1770	<i>G</i>	27
43	77·3	198	153	1640	<i>G</i>	20
44	77·6	205	159	1800	<i>g</i>	29
45	77·7	197	153	1645	<i>G</i>	47
46	77·8	193	149	1625	<i>G</i>	45
47	77·9	204	159	1660	<i>g</i>	30
48	78·0	191	149	1645	<i>h</i>	29
49	78·1	192	150	1725	<i>H</i>	29
50	78·3	198	155	1615	<i>h</i>	51
51	78·3	189	148	1615	<i>h</i>	adult
52	78·4	194	152	1620	<i>h</i>	21
53	78·4	190	149	1660	<i>H</i>	20
54	78·6	196	154	1750	<i>H</i>	45
55	78·7	193	152	1770	<i>H</i>	24
56	78·7	196	155	1600	<i>r</i>	22
57	78·8	193	152	1690	<i>H</i>	26
58	78·9	194	153	1710	<i>x</i>	26
59	79·0	195	154	1690	<i>j</i>	24
60	79·2	197	156	1675	<i>R</i>	46
61	79·2	197	156	1650	<i>j</i>	28
62	79·4	194	154	1560	<i>R</i>	63
63	79·4	194	154	1640	<i>R</i>	64
64	79·5	202	161	1790	<i>R</i>	36
65	79·5	190	151	1640	<i>j</i>	46
66	79·6	182	145	1600	<i>J</i>	33
67	79·7	192	153	1635	<i>j</i>	24
68	79·8	193	154	1655	<i>j</i>	32
69	79·9	199	159	1705	<i>J</i>	60
70	80·1	191	153	1710	<i>K</i>	22
71	80·2	207	161	1810	<i>k</i>	60
72	80·3	198	159	1700	<i>k</i>	22
73	80·3	188	151	1670	<i>k</i>	19
74	80·5	190	153	1675	<i>k</i>	19
75	80·5	190	153	1620	<i>k</i>	37
76	80·8	188	152	1570	<i>K</i>	25

TABLE 17.—SOUTH-EAST CARMARTHENSHIRE—*continued*.

No.	Cephalic index.	Head length.	Head breadth.	Stature.	Map letter.	Age.
77	81·4	193	157	1625	R	adult
78	81·6	195	159	1585	I	25
79	81·6	195	159	1620	R	24
80	82·3	192	158	1810	R	20
81	82·6	196	162	1640	M	22
82	83·3	192	160	1690	N	adult
83	83·9	181	152	1640	N	26
84	87·6	186	163	1680	P	19

CARMARTHENSHIRE.

Cephalic index.	Black hair, brown eyes.	Brown hair and eyes.	Brown hair, light eyes.	Light hair and eyes.	Light hair, dark eyes.	Reds.	Total.
Under 73	1	2	0	0	0	1	4
73	0	1	3	1	1	2	8
74	2	5	6	5	1	1	20
75	0	6	12	3	2	2	25
76	2	7	4	6	0	0	19
77	1	5	8	6	0	2	22
78	1	11	9	3	1	5	30
79	1	8	4	7	0	7	27
80	2	6	3	4	2	1	18
81	0	1	1	3	1	2	8
82	0	2	0	1	0	2	5
83	0	1	1	1	0	0	3
84 and over	0	0	1	0	0	0	1
	10	55	52	40	8	25	190

THE SOUTH COAST OF WALES.

It is felt that the ethnographical problem of Pembrokeshire, Gower and the Vale of Glamorgan differs deeply from that of the remainder of Wales, and would need, even more than this latter, a knowledge of the ethnography of England for its solution. These are areas which have been visited by Dolmen-builders, Bronze

Age traders, immigrants from Ireland, Sea-Rovers, Normans, Flemings, Huguenots, and probably even others, and to distinguish them anthropologically, especially as regards the many varieties of broad heads, would be a task of extreme difficulty. Probably a distributional study of fair types will show that they are abundant in South Pembrokeshire and patchily distributed towards the north as far as the line of the Rivers Ystwyth and Wyre.

Needless to say, the Neolithic stock or Mediterranean race is well represented even on the south coast, for the moorlands are ceaseless exporters of men, but in those districts which are purely agricultural that ancient stock is by no means so dominant as it becomes in industrialized or coal-mining areas, such as that north of Gower.

These localities have a considerable fair-haired element with indices for the most part between 75 and 80, and there are also dark, broad-headed people in considerable numbers near the South Glamorgan coast and elsewhere, but the detail cannot be worked out at present.

We incline to think of the Anglicizing of these regions as the result of the adoption of English as a *lingua franca* between the various elements mentioned, at some time when human locations were brought into general relation with one another, as, for example, through the building of the Norman and Plantagenet castles at stations along the through roads of the South Welsh coast-lands.

In considering the linguistic boundary one must remember the former wood and swamp condition of vales intervening between the coast occupied by immigrants and wanderers and the aboriginal moorlands above.

Reference should be made to Dr. Beddoe's¹ summary on Pembrokeshire.

SUMMARY OF TYPES AND DISTRIBUTIONS IN WALES.

1. The fundamental type is certainly the long-headed brunet of the moorlands and their inland valleys. He is universally recognized as belonging to the Mediterranean race of Sergi and as dating back in this country to early Neolithic times. Close analysis reveals varieties of this type as follows:—

- (a) A Mediterranean type with head length about 204, head breadth about 153 mm., cephalic index about 75, occiput well marked, but glabella not very prominent, nose straight, complexion inclined to swarthinness. Skull form usually ellipsoid or ovoid (Sergi's types). Hair and eyes very dark. Stature about the general average—*i.e.*, about 1690 mm. This type is highly characteristic of the inland valleys around the "prehistoric moorlands" of South Cardiganshire, North Pembrokeshire, and North Carmarthenshire. We think it represents a Mediterranean type with a possible trace of older types. (Plate I, 2A and 2B, and perhaps Plate IV, 4, and Plate V, 6.)

¹ Beddoe, *The Anthropological History of Europe*, pp. 145–151 (1912 edition).

- (b) A Mediterranean type with head length about 196 and head breadth about 153—*i.e.*, a type with occiput less prominent than in the preceding one. Cephalic index about 78, beloid form of the skull probably most characteristic. Nose straight; pigmentation of skin, hair and eyes, especially the last, less marked than in No. 1 (a), especially among males. Stature rather lower than in No. 1 (a). A rather smooth contoured head and face variety of this type, and, to some extent, of No. 1 (a) is the characteristic Silurian type so well known from the valleys of the Glamorgan and Monmouth hill-country, and it is found also around the small moorlands farther west. Under healthy conditions this type may have a fine fresh colour. We think the darker representatives of this type, with high absolute head length, the most typical members of the Mediterranean stock. Those with rather less pigmentation show a characteristic dilution of other characters; they are only very rarely prognathous and the occiput is not well marked.
- (c) A Mediterranean type with narrow head, say 198 mm. by 148 mm. (*i.e.*, cephalic index rather below 75) with rough features and especially rather prominent cheek bones. The forehead is well developed, the occiput moderate, the head rather high, prognathism not general, stature variable but inclined to be above the average, and general build somewhat loose. Some persons with these general characteristics have black lank hair and, especially if they happen to be slightly sallow, they inevitably suggest the Mongolian and, more especially, a Japanese-noble type. Some such type interested Beddoe¹ and from some of his photographs which we have seen it might be the same as ours, but he says his type is probably related to that of Furfooz or Grenelle. These Neolithic European stocks were, however, broad-headed,² so we doubt this identification. Beddoe calls the type "Mongoloid," and notes 34 instances with cephalic indices varying from 72 to 86 and averaging 78-9. On the whole we are, therefore, inclined to reject Beddoe's homology of his "Mongoloid" type with those of Furfooz and Grenelle. We do this all the more because we do not find the "Mongoloid" character to any extent associated with broad-headedness.

This character is one which is difficult to study, as it is a matter of very fine shades of difference, and we should not be averse to dropping the term "Mongoloid" altogether. If we have at times set out to look for Mongoloids we have found rather too many, and we are inclined to think that we have to do with a type which has the eyelid opening lengthened out laterally, probably in correlation with strong growth of the zygomatic arches. We may note here Boyd-Dawkins' surmise³ that

¹ Beddoe, J., *Races of Britain*, 1885, pp. 8-13.

² Déchelette, J., *Manuel d'Archéologie*, 1912, vol. i, p. 483.

³ Boyd-Dawkins, W., *Cave Hunting*, 1874, p. 353; *Early Man in Britain*, 1880, p. 233.

the modern Eskimo, classified under the *Leiotrichi* and mostly dark and long-headed, are related to one type of Western European Palæolithic men.¹

The question of a possible homologization with the type of Cro-Magnon and Laugerie Basse is worth raising. The type individual had an index of 74 on the skull (75.5 on the living head), but his measurements were all very large²—maximum length 203 (212–13 with tissues) maximum breadth 150 mm. (159 with tissues). Not all Aurignacian types, however, reach these figures, which are very exceptional, though approached by one at least of the tall, dark long-heads on our Denbighshire list. (See pp. 67–68.)

The height of the head, the prominence of the zygomatic arches, the tendency to surpass the average in stature, the well-developed forehead and moderateness of the brow ridges are all points of likeness, but are stated without a desire to emphasize a point, which must remain doubtful for the present.

In this connection it is interesting that this type, or these types, occur especially in North Wales, so far as our present information goes. The Neolithic settlement areas of North Wales are for the most part small moorlands, and are isolated in many cases by what must have been formidable barriers in the shape of deep wooded ravines. The Neolithic settlement areas in South Wales, on the other hand, are larger, lower, more contiguous and continuous, and much more sunny. In the former we might expect, perhaps, to find old stocks shut in and protecting themselves by wilful isolation (see p. 145, *re* folklore), whereas the latter might more easily receive and absorb successive waves of immigrants. The latter might thus have very typical average Neolithic people; the former, as also any patches of special poverty and isolation in the south, might, on the other hand, show remnants of early Neolithic immigrants, among whom might even be surviving descendants of Palæolithic types. (Plate V, 5, doubtfully, and Plate IV, 4, very doubtfully; both of these are Mediterraneans with zygomatics well marked.)

- (d) A Mediterranean type which seems to resemble the Borris skull³ as already discussed on pp. 62–63 (Plate I, 1A, 1B, Plate IV, 5, Plate V, 1, 2). This type is characteristic of the Plynlymon moorland, an isolated, impoverished, bleak moorland, impoverished probably still further within historic times through completion of the replacement of its forest by peat. It has already been mentioned that Borlase⁴ found an Irish skull of this type

¹ Testut, "Squelette de Chancelade," *Bull. Soc. Anthropol. Lyon*, VII, 1889. He draws attention to resemblances between the Chancelade man and the Eskimo, in the height of the narrow head, the length of the face, the great breadth of the zygomatic arches, and the very short stature. The Chancelade face is very different from that of Cro-magnon man.

² Keith, A., *Antiquity of Man*, 1915, p. 54; *Reliquiae Aquitanicae*, 1865–75, pp. 111 ff.

³ Laing, S., and Huxley, T. H., *Prehistoric Remains of Caithness*, 1866, pp. 125 ff.

⁴ Borlase, W. C., *Dolmens of Ireland*, 1897, pp. 922 ff.

belonging to the early centuries of our era, and it is generally surmised that there are survivals of this type in modern Ireland. Its ultimate homologies remain doubtful, the brow recedes too much for us to approximate the type to most of the Aurignacian skulls known, and there are many objections to the assumption of Neanderthaloid relationships save, perhaps, of a very distant kind. The rather striking resemblance to the Galley Hill type is less valuable than it might be, because the period of the Galley Hill skull is a matter of dispute, and if that skull is really Chellean, as is sometimes claimed, that period is too far off to make a claim of kinship of much value.

Rice Holmes¹ has a useful note on this point, which we quote here:—

“MM. de Quatrefages and Hamy affirm that the Neanderthal race has left a permanent imprint on the population and refer to various skulls of the Neolithic and later periods which resemble more or less closely that of Neanderthal. Moreover, it is generally admitted that even at the present day a few individuals here and there belong to the same type. But it does not follow that these persons to whom Dr. Beddoe and M. Hamy refer were descended from men who lived in Britain in the Palæolithic Age.”

Keith² and other modern workers would not agree with the idea that it is the Neanderthal race which influences modern types. All that is really meant is a long-headed stock with rough features, strong brow ridges, low receding forehead, and head measurements all large except the auricular height.

- (e) A Mediterranean type with reminiscences of negroid character, perhaps suggesting links with the Palæolithic negroids described by Verneau³ from the Grottes de Grimaldi. This type is rather small, shows marked dolichocephaly, often without large measurements, has dark eyes, black hair, which is closely curled, a rather broad nose and short stature. We have met only the slightest traces of this type, and think it wise to do no more than mention it at the present stage (Plate IV, 6).

Other types found in Wales include the following:—

2. Nordic and Nordic-Alpine types. These grade into one another so closely that it is difficult to make more exact subdivisions. It will be noticed in our tables that the cephalic indices of fair types vary within broad limits, but that the numbers with indices under 76 or over 81 are often small. Here and there some upward extension of this limit is traceable, and we think it would be noticed on the Welsh border and in Brecknock. We tentatively subdivide as follows:—

¹ Holmes, T. Rice, *Ancient Britain*, 1907, p. 385.

² Keith, A., *Antiquity of Man*, 1915, *passim*.

³ Verneau, R., “Les Grottes de Grimaldi” (Baoussé-Roussé, *L'Anthropologie*, 1906).

- (a) A type with light brown or fair hair, eyes which are often blue and only rarely brown flecked, considerable strength of brow and of jaw and chin, good features, mesaticephaly as a general character, frequent tall stature. Newcastle Emlyn is a well-marked nest of this type, and it is somewhat characteristic at Towyn. Needless to say, it is very marked in several localities in South and South-west Pembrokeshire. This type seems to be the local version (Plate III, 1, Plate IV, 1) of the Nordic type so far as we can judge from a comparison of our results with the conclusions of G. Retzius.¹
- (b) A somewhat heavier variant of the above, with shorter head than the above and extremely tall stature. The cephalic index would be above 80 in many cases, on the living head. The face hair of the men is usually rough. We think these men will be identified to a considerable extent on the Welsh border and suspect that, mixed with 2 (a), they may represent the Brythonic wave of immigration into Powys (see pp. 142-147).
- (c) The Borreby, or Beaker-Maker Type (Plate III, 2A, 2B, Plate IV, 2, and (?) Plate V, 3, 4). Probably tall and often fair, light eyed, broad headed, short faced. There seem to be darker grades of pigmentation, as might be expected if we are right in surmising that we are dealing with a cross between broad-headed and rather dark Alpines on the one hand, and longer-headed fair Nordic types on the other. The convex nose-profile occurs frequently. The brows are well marked, and the fine forehead usually recedes considerably. The type is discussed at greater length on pp. 86-87. It is characteristic of the long cleft from Corwen *via* Bala to Talyllyn and Towyn.

3. Not very commonly seen. Dark, bullet-headed, short, thick-set men, of the general type denoted by the term Alpine and more exactly, perhaps, by the term Cevenole. It has seemed to us that there are several representatives of this type among the inhabitants of the North Montgomeryshire valleys leading down to the English border, but there cannot be said to be any "nest" of them as yet known. We feel the need of a survey of English types before discussing this in more detail.

4. Powerfully built, often intensely dark, broad headed, broad faced, strong and square-jawed men characteristic of the Ardudwy coast, the South Glamorgan coast, the Newquay district (Cardiganshire), Pencaer in North Pembrokeshire and other places. The stature would seem to be about average, but some individuals are very tall indeed (Plate II, 1A, 1B). A further discussion of this type will be found on pp. 89 and 137-142.

Note.—In addition to the above types we have the following:—

- (a) Rather tall, powerfully built men with large, broad, high heads, high foreheads, strong eyebrows, usually medium brown hair with light eyes and,

¹ Retzius, Gustav, "The so-called North European Race of Mankind," *Journ. Roy. Anthropol. Inst.*, xxxix, 1909, p. 277.

frequently, a rufous beard. These occur chiefly along the coasts. It would seem that the type is some variant of No. 2 above, possibly with No. 4 also influencing it.

- (b) Fair, medium to broad headed men with slight rufous tendencies, found in South-west Wales. Often less powerfully built than (a), features less strong in most cases (Plate IV, 3).
- (c) "Red" people, that is people with distinctly red hair, and not merely a suggestion of redness in what is really a fair type. These people typically have strong zygomatic arches with a sinking of the cheek below the arch. The chief centres for these are the Plynlymon moorlands, the neighbourhood of Tregaron (Cardiganshire), the Taf, and possibly the Gwendraeth regions of Carmarthenshire. There are, no doubt, other localities not yet sufficiently determined, but this type seems scarce in most parts of Merionethshire. It is claimed to exist also in North and North-west Denbighshire, and we hope to discuss this in a future paper.

This distribution does not suggest that the "red type" is an independent one, and it may possibly be a result of persistent crossing, but for further elucidation of this point study of pedigrees and family portraits will be very necessary. A cephalic index of less than 75 is not at all common amongst red-haired people in Wales, and this of itself suggests that the red type is in some way related to the fair type. (Nordic, see No. 2 above.)

In the next section of the paper an attempt, which will necessarily be somewhat speculative, will be made to suggest certain hypotheses as to race history in Wales and in Britain as a result of our Anthropometrical Survey of Wales, and correlated archæological and geographical study. It should, however, be understood beforehand that no claim is made to identify a Goidelic or a Brythonic or a more generally Celtic type. These are names in linguistics, and it is dangerous to apply them in physical anthropology. From descriptions in the *Mabinogion* it would seem that the princes and princesses were often distinguished by their yellow, golden, or fair hair, so that, possibly, the general mass of the people was dark at the time when the Celtic romances were gaining their definitive shape, *i.e.*, the "Mixed" race conditions of the population certainly go extremely far back. It may, in fact, be wondered whether either branch of Celtic-speaking invaders, or even the Bronze Age invaders, if these latter were pre-Celtic, were pure stocks.

Reference will be made in the sequel to most of the types above listed and the numbers will be given for reference.

Nothing will be said, however, of No. 3 (the Alpine-Cevenole type). It would be interesting to hunt for it among the upper ends of valleys of Shropshire and the Welsh border generally. The "Red" Type will also be neglected, as the accepted hypothesis is that it is not an independent type but may arise anywhere as a result of crossing, and more evidence is necessary for re-discussion.

A few points of general interest may be noted here. Types 1 (a) to 1 (e) con-

tribute considerable numbers to the ministries of the various churches, possibly in part from inherent and racial leanings, but partly also because these are the people of the moorlands. The idealism of such people usually expresses itself in music, poetry, literature and religion rather than in architecture, painting, and plastic arts generally. They rarely have a sufficiency of material resources for the latter activities. These types also contribute a number of men to the medical profession, for somewhat similar reasons no doubt.

The successful commercial men, who have given the Welsh their extraordinarily prominent place in British trade (shipping firms for example), usually belong to types 2 or 4, rather than to 1, as also do the great majority of Welsh members of Parliament, though there are exceptions of the first importance.

The Nordic type is marked by ingenuity and enterprise in striking out new lines. Type 2 (c) in Wales is remarkable for governmental ability of the administrative kind as well as for independence of thought and critical power.

THE ETHNOLOGY OF SOUTH BRITAIN IN CONNECTION WITH THE FOREGOING OBSERVATIONS.

In spite of the fact that the questions of British Ethnology have been discussed so often, we think it incumbent upon us to sketch out a synthesis of the population of South Britain, in relation to our work. In order to reduce the length of this portion of our statement within manageable dimensions, we ask readers to refer for previous discussions of the questions involved to:—

Keith, A., *Antiquity of Man*, 1915.

Holmes, T. Rice, *Ancient Britain and the Invasions of Julius Caesar*, 1907.

Déchelette, J., *Manuel d'Archéologie*, 1912–14, Paris.

Dottin, G., *Manuel Celtique*, 2nd Edition, 1915, Paris. Ed. Champion.

Our summary will give only a minimum number of references to literature, and we hope that this will not be misinterpreted as a neglect of previous authors—it is rather a tribute to the comprehensiveness of treatment in the general studies just named.

We think it is most useful to commence our survey by attempting to recreate in imagination the Britain of early prehistoric times, after the end of the Ice Age at any rate. On the question of the continuity of Palæolithic and Neolithic life in or near Britain our work has only a very slight bearing, which we may mention briefly. It has been inferred above that among the Neolithic types in the population there are, for example in North Wales (Gwynedd), what may be marked traces of the Cro-Magnon (Aurignacean) or other earlier stocks, and their locations are related to some of the smaller and poorer moorlands, places of refuge and of isolation (1c in list). We have also hinted at certain, perhaps very ancient, relationships for our Plynllymon variety which probably exists also in Ireland (1d in list). These types may be the remnants of some early Neolithic immigration up from the South (Gaul), for such immigration would include "Palæolithic sweepings"; but the

probability that we have actual nests of these ancient types fairly readily distinguishable from the average Neolithic stocks seems to hint that there was continuity of life from Palæolithic to Neolithic not very far away from Britain to say the least. Peake suggests¹ that possibly the finds at Cissbury and Grimes' Graves may be interpreted as survivals of Palæolithic life in early Neolithic times, and he adds some interesting notes about survival of types, with which on the whole we are inclined to agree.

It is fairly generally agreed that even if the Palæolithic period graded into the Neolithic without a break, whether actually in Britain or in some region near by, the serious adaptation of Britain to human needs began with Neolithic immigration, for if Palæolithic man was a mere wild hunter, spreading more or less in Britain in the warmer intervals of a Glacial Age, his numbers must have been very small. Indeed, allowing that some parts of Britain were perhaps mere Tundra at the best, one may imagine, with some show of reason, that only in favoured periods (such as, perhaps, the Aurignacean) would the population have reached, at a rough estimate, four figures. A hunting population is bound to remain very sparse.

It will, therefore, be advisable to picture first of all the relations of Britain and Western Europe in early Neolithic times.

The Neolithic Immigration into Britain.

We may think of the Mediterranean region and even the Sahara enjoying a fairly cool climate while the ice still spread over Britain, and then we imagine the northward shift of climatic belts as the ice diminished and disappeared. With this shift went a corresponding human migration, for the north of Africa would become drier and less fit for man, and the country redeemed from the ice would become more suitable.

The ways northward from the Mediterranean region must have been somewhat limited at first. The Alps would long retain their ice sheet and thus remain inhospitable, so would the Illyrian Mountains, the Balkans, and the Carpathians. The chances of northward migration in early times from the Eastern Mediterranean or the Adriatic would thus be restricted, and the limitations would be found to be still greater if the physical conditions (*e.g.*, a possible large cold inland lake in the Hungarian basin) were worked out in detail.

Farther west the window between the Alps and the Pyrenees offered some opportunities, but the valley of the Rhone would probably not be used. Even as late as the La Tène period the Rhone valley was only just coming into use. "A l'époque de la Tène le commerce massaliote (*i.e.*, of Marseilles) mit la Gaule centrale en relation régulière avec la Méditerranée, mais auparavant ce n'est pas par la vallée du Rhône que les influences helléniques se sont exercées sur les Celtes; c'est par la voie des Argonautes, c'est-à-dire par les vallées du Po et du Tessin et par les lacs de la Suisse." This summary by Déchelette² gives the substance of views he

¹ Peake, H. J. E., "The Excavations at Grimes' Graves," *The Antiquary*, 1915, pp. 375 ff.

² Déchelette, J., *Manuel d'Archéologie*, 1913, ii, p. 569 and pp. 580-7.

has argued out with many references to literature, and they need not be argued afresh, for, as far as the Rhone valley is concerned, there is little difference of opinion. An imaginative reconstruction on the spot of post-glacial forest conditions in the Rhone valley from Lyons down to beyond Valence helps one to realize what efforts were needed before that region became other than a barrier to human intercourse, and one realizes the separateness of the Halstatt culture of the Côte d'Or from contemporary affairs on the Mediterranean coast of Provence, etc. Peake¹ has gathered independent evidence for the early separateness of the Provençal region from the Saone region which is fairly convincing.

The more westward route, however, along the northern flank of what afterwards became the gate of the Carcassonne, was largely along Les Causses, a limestone country and therefore bare and open. This north-westward route from Narbonne, probably along the windswept and thus bare western brow of the great Massif Central of France, is marked out as one of the ancient tracks of mankind. North-westward it would utilize the low, but bare, uplands of La Gâtine, and so it would reach Brittany and Le Cotentin.

In addition to this line of migration there would also be a possibility of movement along the coast of the Iberian Peninsula, but it will be generally allowed that the Neolithic period must have advanced far before that route could lead men in any numbers to Brittany. We are not aware that anyone would say that the strictly northern coast-line of Spain has changed very much in human times, and consequently the possibilities of migrations towards France would probably be fairly limited. Much of the interior of Spain was doubtless bare, and this must naturally be remembered as giving opportunities for movement. But if any northward movement passed the perennial barrier of the Pyrenees at the eastern end it would simply come into the Narbonne-Brittany line already discussed. The possibility of movement around the western end of the Pyrenees and then up the Biscayan coast of France is thus the one alternative. For a long time the Landes of South-west France have been an important hindrance to movement, but it would be easy to argue back too far on such a point.

It will be remembered that Ripley² argues for the survival of the "Cro-Magnon" type in large numbers along the plateau edge and just off it, in the Dordogne county (Perigueux and Angoulême). We think it probable from the maps he gives that the Mediterranean race may be more prominent in Médoc and other coastal districts of West France than his statements lead one to think, but, at all events, his collation of observations so far strengthens our main point, which is the importance of the Narbonne-Brittany line of movement from very remote times.

We thus have people spreading from the Mediterranean along one way or the other, and principally no doubt along the way we have discussed, reaching the south shores of the English Channel, and doubtless getting to Britain, whether across a

¹ Peake, H. J. E., "The Early Bronze Age in the Lower Valley of the Rhone," *Revue d'Ethnographie et de Sociologie*, Paris, 1914, pp. 57-64.

² Ripley, W. Z., *Races of Europe*, 1899, pp. 163-179.

then dry-land portion of the Channel, or across a strip of water possibly much narrower than it is now.

There is no dispute about the ancient population of the Mediterranean littoral, apart from the Balkan Peninsula; it persists in most districts and is dark, long-headed, oval-faced and short. The facial contours are often smooth. We may thus suppose that it was this type, with Palæolithic admixture from the central plateau of France, that brought Neolithic culture to Britain.

Conditions and Locations of Neolithic Life in Britain.

In the earlier part of this paper it has been shown that Neolithic types, with or without much Palæolithic admixture, persist in abundance in Wales and are specially characteristic of the inland valleys around certain moorlands which are their immemorial homes. The underlying geographical fact seems to be that Britain is in the region of temperate deciduous forest and, in its pre-human condition, the valley sides were forested and the valley floors were either woodland or swamp. The woodland was the haunt of the wolf and the wild boar, marten, wild cat, and other dangerous animals; and man, equipped with but stone tools, was not able to do much against the wet forest full of these dangers. Moreover, ague must have been a serious plague in the wet low ground. He thus settled chiefly on the uplands, the stretches of bare and windswept moorland on which we find traces of his work and his memorials (Fig. 6).

The Downs of the South of England offered many advantages. The chalk surface meant that the land was dry and forest-free, save in a few hollows where alluvium might accumulate. The chalk was workable with antler and wood picks, and so ramparts and earthworks could be scarped out. There was flint available, often within the earthwork itself. The Downs are nowhere very high and their southerly position gives them further climatic advantages: they have considerable sunshine and fair rainfall. The long straight ridges offered advantages for trackways for change of pasture, and there were many springs, arising not so very far below these ridgeways, from beneath the base of the chalk along its scarp edge.

One should notice particularly the amount of moorland hill-pasture, and other uncultivated land at the present day at the 500-foot level or below it around St. Alban's Head, Dorset.

The Western Downs and the White Horse Hills would share most of the advantages of the North and South Downs.

From them to the Mendips, or farther south to the Blackdown Hills, was a short transit, and on both these areas there was considerable opportunity for early settlement. From the Blackdown Hills to the southern slopes of Exmoor and so on to Dartmoor and the moors of Cornwall was a possible line of movement, and we think most of these areas will be found to have been occupied in Neolithic times. We also think the Neolithic type would probably be found in several places in inland valleys around these upland areas if looked for at the present day.



FIG. 6.—TENTATIVE MAP ILLUSTRATING THE CHIEF LOCATIONS (WHITE) PRACTICABLE FOR NEOLITHIC LIFE IN BRITAIN.

The black indicates country sparsely occupied at that time, mainly because of swamp and forest.

Islets in the swamp and patches of open forest (without tangled undergrowth) would, however, be used to some extent.

Areas made difficult by great elevation and rocky character are stippled.

In Neolithic times the absence of flint would be a drawback at first in South-west England, but, as the art of grinding stone grew up, that drawback would operate no longer, as various rocks of the South-western Peninsula would lend themselves to grinding.

We think it is generally agreed that the lines of the Downs have been lines of immigration, intercourse, and conflict for long ages in the past, and it would therefore be natural if the older strata of the population had ultimately become difficult to distinguish. We believe the type does occur in numbers among the inhabitants of patches of sandy heath and other poor soil areas near the Downs, *e.g.*, the north-west side of the New Forest. On these sandy areas the Neolithic culture is also said to have lingered after the Bronze culture had spread on the chalk uplands close by.¹ Romney Marsh seems also to have retained Neolithic types.

The Neolithic type is well known and abundant in South-west England (including Somerset to some extent), and belongs very characteristically to the valleys around Dartmoor and the moors of Cornwall. One might associate this survival with the remoteness of the district, but there is always a danger of referring to remoteness as though conditions were similar in all periods. Devon and Cornwall are remote from London or from Dover, but we shall discuss other routes later on for which Devon and Cornwall must have been not far from the main line.

The Thames basin must have been in the main a barrier and the southern end of the Chilterns, with drift over the chalk, was forested, as were most of the drift-covered chalk surfaces of East Anglia; the chalk valleys of that region, on the other hand, would have been bare, and the chalk edge over against the Fens would be bare also; Crawford² shares this view.

Farther west, the Western Downs and Mendips would almost connect with the open country of the Cotswolds, and so on via Edgehill either to the Clent Hills and Cannock Chase or to the Northamptonshire heights. The greater part of the Midlands must have been very inhospitable, as Abercromby³ also urges, and, in the Midlands generally, the survivors of the Neolithic population are probably not abundant, but according to Beddoe⁴ they are fairly numerous about the Leicestershire and Northampton heights and it is generally allowed that they are also numerous round about the Chiltern Hundreds.

The latter case may be the result of the protection London's resistance to Anglo-Saxondom offered them, if Gomme⁵ is right, during the post-Roman chaos, but without emphasizing this view we may account for this survival if we remember that the London Clay to the north of the Thames, and the Boulder-Clay-covered slopes of the Chilterns long remained forested and so gave shelter to refugees in post-Roman times. The former case is a region of woodland with, as

¹ Johnson, W., *Folk Memory*, 1908, p. 46.

² Crawford, O. G. S. *Geographical Journal*, 1912, vol. xl, pp. 184-7.

³ Abercromby, J., *Bronze Age Pottery*, 1912, pp. 81 and 109.

⁴ Beddoe, J., *Races of Britain*, 1885, p. 254.

⁵ Gomme, Sir G. L., *London*, 1914, pp. 74-120.

Beddoe¹ points out, fens to the east, a region into which the conquered folk might retreat or, perhaps also, a region in which even conquering invaders would be rather at a disadvantage in attacking a long-established population. Beddoe notes, however, a heavy incoming of French people into Bedfordshire after the Norman Conquest. It may be mentioned that Beddoe incidentally remarked that he did not believe the Saxons destroyed London.

In Norfolk it is generally allowed that the Neolithic type survives around Brandon, while it is found also in the Fens.

Generally speaking we should consider that, in England south of the Mersey-Humber line and east of the Quantocks and Blackdown Hills, the Neolithic type is fairly generally distributed but is characteristic chiefly, not of its primeval locations, but of the poorer, wilder districts into which it was forced to retreat, *i.e.*, districts which long remained forested or which are marshes. London, however, has a strong Neolithic strain, largely perhaps the result of immigration. This strain is characteristic of the poorer districts, and it appears that the Neolithic type is more resistant to the evil influences of slums and overcrowding and more psychically adaptable to their conditions than are most of the other elements of the population.

Looking farther north we find a considerable area of primeval open country in the Southern Pennines, the Yorkshire Wolds and the North York moors.

Elgee² says of high parts of the last named that on considering their superficial deposits as a whole, it must be admitted that they contain no evidence of ever having been covered with forests or even woods. There may have been occasional trees or shrubs.

Farther north still the Pennines include large areas of rock more than 2000 feet above the sea, and the zone fit for settlement would probably be found to be less extensive. In Cumbria also the sharpness of the slopes and the great valley lines would give only limited scope for early man.

As regards the Pennine district, the meagre details of post-Roman history allow us to see that the ancient population maintained a fairly effective struggle on its moorlands and their forest-clad eastern slopes against the Kingdom of Deira established by invaders on the low ground above the semi-estuarine marshes of the Ouse, and on the higher ground farther east. It is noticeable that this struggle was apparently most effective in Elmet, where the forested region round about the modern Leeds stretched well down towards the Ouse marshes.

The ancient population survives in large numbers at the present day around the Pennines, and naturally it is found more particularly on the Lancashire side, contributing a very important element to that character which makes Lancashire such an interesting factor in British life. On both sides of the Pennines the old population displays its powers of resistance to the evils of the poor quarters of the large towns. In considering the persistence of the old population in Lancashire

¹ Beddoe, J., *op. cit.*, pp. 254-5.

² Elgee, F., *Moorlands of N.E. Yorkshire*, 1912, p. 131.

one must remember that much of South Lancashire used to be very swampy, and that in this way access from the south was greatly limited in pre-industrial days. Local inquiry shows that even such a revolution as the Anglican schism in the sixteenth century affected Lancashire (from Wigan northwards and north-westwards) only very gradually and partially; some religious and economic features of that district at the present day may be surmised to be survivals of Mediaeval conditions.

In Beddoe's day,¹ apparently, the older population was not a very important element in the West Riding and there is need of local study to ascertain its proportions at the present time, but there is little doubt that in the second generation of big-town conditions this type has surged up in several parts. There is also little doubt that the changes in proportions of the types may have no small bearing on social and even political changes in the country.

This sketch of early centres of population in South Britain is given in the hope that it may encourage local inquiry with a view to more accurate and local observation in this field. The human locations in early Britain were, as we have seen, mainly in the south-west, south, east, and north. Those in the Midlands were less important, and consequently Wales was much isolated. This isolation was the more marked because the basins of the Dee and the Severn must have been most difficult to cross. One recalls both the Welsh and the English names for Shrewsbury, Pengwern (the head of the wood) and Shrewsbury (corrupted from the Borough in the Scrub) which, once the capital of a Welsh prince, was conquered by Mercia, and has gradually been, as it were, reconquered in modern times in peaceful fashion by more or less Anglicized Welshmen. It stood at a strategic point near one of the only practicable early routes, namely, that from the Clent Hills, Cannock Chase, Wenlock Edge, etc., across to the Longmynd and related highlands which led on to the Welsh moorlands. Ludlow stood at another, it may be added.

In all the border country, the export of men from the moorland has made the population Welsh to a considerable extent and the Neolithic blood is much in evidence, though it is rarely as pure as in the inland valleys of the truly Welsh coastal moorlands discussed in a previous section.

In Wales we thus have the Neolithic type highly characteristic of the southward sloping moorland hills of Glamorgan, whence it has spread in modern times into what have become the coal valleys. This purest example of the Neolithic type (1 (a)–1 (b)) has survived, perhaps, mainly because of the isolation of the district with the Forest of Dean and, in earlier times, the general forest-and-swamp of the Severn basin. The district was also isolated from the Bristol Channel by the forested portions of the Vale of Glamorgan. This isolation is not assumed to have continued far into historic times.

It is natural that valleys of the moorland farther west show traces of the

¹ Beddoe, J., *Races of Britain*, 1885, p. 251.

oldest waves of Neolithic immigration, *i.e.*, of Neolithic types with perhaps Palæolithic admixture (1 (a) to 1 (d) and a few of 1 (e)).

The same point may also be made with reference to the moorlands of North Wales (especially 1 (e)), which are often fairly small and isolated, though the Mynydd Hiraethog must have offered reasonable space for the life of early times.

The abundance of moorland in Wales has brought about a general scattering of the Neolithic type throughout the country, especially in view of the fact that the moorland valleys with their limited opportunities have been exporting men for ages.

The Welsh coasts have seen so much immigration that one cannot now trace local concentrations of the Neolithic types corresponding with coastal and Netherland areas formerly occupied by them there. The point is one, however, to be borne in mind in any detailed human survey of a county like Pembrokeshire, where some rather poor-soiled or isolated patches near the shore might show such concentrations, just as some patches of poor sandy soil near the Chalk Downs show them though the Downs above have been a highway of invasion, immigration, and commerce during very many centuries.

In order to follow further changes we should picture a Britain in which the Downs of the south country had a certain leadership with their centre at the great cross-roads whence ways radiated along South Downs, North Downs, White Horse Hills, Mendips, and Blackdown Hills (Fig. 6). From the two latter, ways lead on respectively to the Cotswolds, and Northampton and Leicester, via the Chiltern Edge to the Chalk Edge of East Anglia, and via South Exmoor to Devon and Cornwall. Ways across the Midlands were few and difficult, but it was possible to work across either via the Longmynd to Wales or via the north side of the Trent valley to the Pennines.

Another way into Wales would be across the Bristol Channel from the Mendip district to the Barry district, but this would involve a sea crossing.

The subject of early centres of population in Britain is discussed in geographical detail in another article,¹ to which reference may be made. It might be assumed that, at the latest, the separation of Britain from the Continent occurred in Neolithic times. By the end of that period it would seem that sea communications were becoming important. In studying early movements by sea in the British region, with its cloudy skies and changeable weather, it is well to remember that it was then a risky proceeding to sail out of sight of land, save under special conditions of weather and experience. The Channel crossings are interestingly studied by Belloc² from this point of view and he shows that, in addition to the Straits of Dover, the crossing from Barfleur to St. Catherine's Point and thence to other points of the south coast of Britain was feasible and useful. Under special conditions a crossing even farther west might be attempted,

¹ Fleure, H. J., and Whitehouse, W. E., "The Early Distribution and Valleyward Movement of Population in S. Britain," *Archæologia Cambrensis*, 1916, p. 101.

² Belloc, H., *The Old Road*, 1911, pp. 66-7.

e.g., between Cornwall and Brittany, but there would be the one farther in to fall back upon in case of need. Documents from the Middle Ages testify to the importance of the roadstead of Saint Pierre Port in Guernsey for commerce between England and Aquitaine, showing clearly enough that, in spite of rocks and currents, ships then still hugged the coasts. *A fortiori* would they do this in the remote times of the beginning of maritime communications. The Straits of Dover crossing would not have had its present paramount importance in early times, as the north of France then no doubt had a great extent of forest, which partially blocked the roads to the sea. Peake¹ also discusses Channel crossings in this sense.

Archæological Distributions and Early Commerce (see Fig. 7).

It is generally believed that towards the end of the Neolithic Age there was a considerable amount of movement and of intercourse affecting Britain; but in connection with these movements many problems still remain unsolved, though Abercromby, Crawford, and Peake have made distinct contributions to our knowledge concerning them, while both Coffey in Ireland and Déchelette in France have thrown light on the subject from outside.

Crawford² draws attention to artefacts of greenstone found at Breamore and Beaulieu in Hampshire, and mentions that Sir John Evans³ found one in Guernsey. The greenstone is from Brittany in all probability, so that here we have evidence of intercourse more or less along our western line (Cotentin—Hampshire, etc.) and evidence which may date back beyond the days of metal.

Abercromby⁴ says that about 2000 B.C. Britain was invaded by a rugged enterprising Alpine people who lived 300–400 years before, somewhere not very far north of Helvetia. Probably they had followed the Rhine and the coast till they came in sight of Britain. They were characterized by their "Beaker" pottery. They landed without metal, but they soon acquired it. They were mainly pastoral, but they were acquainted with wheat. Their landing was in Kent; they clustered upon the open Wiltshire downs around Stonehenge, thence advancing to the headwaters of the Nen (Northamptonshire heights) and to the Derbyshire Peak (1880 B.C.). It is noted for future discussion that Abercromby finds that they left the west alone, going to Devon, but not to Cornwall before about 1500 B.C. at least. Later on there is evidence from Cornwall in broad-handled pottery of the direct influence of Armorica. Abercromby suggests extreme moistness of climate as a reason for neglect of the far west, but we are tempted to ask whether it was not already occupied by other people. We see, at any rate, that Abercromby

¹ Peake, H. J. E., *Memorials of Old Leicestershire*, 1911, pp. 34–41.

² Crawford, O. G. S., "Prehistoric Trade between England and France," *L'Anthropologie*, 1913, p. 641.

³ Evans, Sir John, *Ancient Stone Implements*, second edition, 1897, p. 107.

⁴ Abercromby, Hon. John, *Bronze Age Pottery*, 1912, p. 110.

recognizes two routes from the Continent to Britain: one from Armorica to South-west Britain, the other across the Straits of Dover region.

Crawford¹ also has studied Beakers and has formed the opinion that the Beaker Makers came from Germany (Elbe as well as Rhine) and settled or penetrated at various places on the coast from Moray Firth southwards to Dorsetshire. He thinks they probably came without a knowledge of metal, but that this soon followed them and he notes that in Britain, but not in Ireland, beaker areas are usually also places where flat celts are found. Ireland has abundant flat celts but no beakers, or only a few doubtful ones.

Peake² emphasizes the movement of people across the North Sea at the close of the Neolithic period, and elsewhere³ states his belief that the Beaker people landed without metal, a belief which Mr. R. A. Smith⁴ shares. Peake⁵ also believes that it was the lure of Irish gold which drew these people across Britain, and he sketches out some of their routes.

Crawford⁶ notes the association of two gold lunulæ with a flat celt of early type in a find in Cornwall.

These views as to Irish gold are not universally accepted, but it seems difficult to find an alternative hypothesis, and even a provisional theory is valuable if lightly held. The lure of Ireland is illustrated in another way. The country most famous for dolmens (Fig. 7) is France and they occur along a line from the Narbonne region along the western edge of the Massif Central to Brittany and Le Cotentin. They are also found around the Iberian peninsula and in North Africa. There is probably reason to expect new information concerning their occurrence in the Balkans and Ægean, and while not necessarily accepting Elliot Smith's⁷ view of their origin from the Egyptian Mastaba, we may provisionally think of their spread from the Mediterranean region. They would have spread thence eastward through Syria to India, northwards through Europe to North Germany and South Sweden, and westward via France as above stated to—

- (a) South-west England⁸—Cornwall, Devon, Somerset with outlying representatives in Wilts and a strong group near Aylesford in Kent.
- (b) South and south-west coasts of Wales⁹—near Barry, in the Gower Peninsula, along lines across Pembrokeshire and in quantities along its coast north of St. David's (Pencaer, etc.).
- (c) Here and there on the coasts of Cardigan Bay.

¹ Crawford, O. G. S., "Distribution of Early Bronze Age Settlements in Britain," *Geographical Journal*, xl, 1912, pp. 184 ff.

² Peake, H. J. E., *Memorials of Old Leicestershire*, 1911, p. 37.

³ Discussion after No. 1, *op. cit.*, p. 200.

⁴ Discussion after No. 1, *op. cit.*, p. 199.

⁵ *ibid.*, p. 200.

⁶ *op. cit.*, p. 202.

⁷ Elliot Smith, G., *Report Brit. Assoc.*, 1913, p. 646.

⁸ Windle, B. C. A., *Remains of the Prehistoric Age in England*.

⁹ See Bibliography in Fleure, H. J., "Archæological Problems of the West Coast of Britain," *Archæologia Cambrensis*, 1915, p. 405.

- (d) In numbers in Anglesey and on some parts of the Carnarvonshire Coast, and indeed along some apparent cross lines.
- (e) Ireland, where the dolmens are exceedingly numerous.

Beyond Ireland they are no longer found, save at St. Kilda.¹ It would seem that, practically, Ireland is the end, and this, whether we regard all the Irish dolmens as due to influence coming along the Brittany-South-west England route or whether we imagine that while some may illustrate that influence others reflect the movements from Germanic lands across to Ireland. Certain detailed resemblances suggest the latter view, but, on the other hand, dolmens are conspicuously absent from Eastern Britain, and beakers, it must be remembered, are rare in Ireland. The probability is that the route via Brittany and Le Cotentin was at first the important one as far as Ireland was concerned. Borlase² emphasizes the similarity between the dolmens of the Lands End district and certain Irish ones and also resemblances between Irish specimens and those of North Germany and South Sweden.

Déchelette³ discusses characteristics of the sculpturings at New Grange and reaches conclusions which Coffey had in part reached beforehand. Though they may refer to intercourse later than that just discussed they are of interest here.

“De l'Irlande la spirale gravée a certainement cheminé jusqu'à Gavr'inis (in Brittany), où elle apparait comme une importation étrangère, absolument inconnue ailleurs dans toute la Gaule occidentale. La Scandinavie, de son côté, avait reçu la spirale de l'Europe du sud, à la seconde phase de son âge de bronze. On ne peut plus songer à la faire venir de l'Irlande et en Scandinavie par la côte de l'Atlantique puisqu'il est bien acquis qu'elle fait défaut dans la péninsule ibérique et sur les côtes françaises de l'Atlantique jusqu'à Gavr'inis.

“Il faut conclure de là, qu'elle a pénétré dans l'Europe du Nord par la voie terrestre de l'ambre. Ainsi les sculptures des mégalithes irlandais sont, en définitive, le produit de deux courants méridionaux aboutissant au même point: le plus ancien, d'époque néolithique, a porté en Espagne, en Gaule (principalement dans la partie occidentale) et dans les Iles britanniques, les dérivés de l'idole égéenne. L'autre un peu plus récent, et correspondant à la seconde phase de l'âge du bronze scandinave, a introduit au nord de l'Europe les spirales et les symbols solaires.

“Les mégalithes irlandais qui révèlent l'empreinte de cette double influence sont donc nécessairement les plus récents.”

¹ Boyle Somerville, Capt., “Prehistoric Monuments in the Outer Hebrides,” *Journ. Roy. Anthropol. Inst.*, 1912, pp. 46 ff.

² Borlase, W. C., *Dolmens of Ireland*, 1897, pp. 439 ff.

³ Déchelette, J., “Nouvelle Interprétation des Gravures de New Grange et de Gavr'inis,” *L'Anthropologie*, 1912, p. 43.



FIG. 7.—TENTATIVE MAP OF SOME DISTRIBUTIONS IN WESTERN EUROPE.

Oblique lines indicate Dolmens. The mapping is based upon Fergusson as regards Africa, Spain, Germany and Scandinavia, upon Déchelette (1912) as regards France and Italy, and upon various authorities as regards the British Isles. Dots indicate the presence of broad-headed dark men as a characteristic element of local population. L indicates finding of lunulae (after Coffey). B indicates presence of beakers (after Crawford), apparently associated with intercourse across the North Sea but not with coasting intercourse from the Mediterranean.

It should be said that the above represents a considerable modification of the views Déchelette expressed in his *Manuel d'Archéologie* (t. i., p. 614, note 2, cft. II, i, p. 498), and the modification is largely due to Coffey's work.¹ The point now reached is that two lines of intercourse and influence from the Mediterranean converged on Ireland as apparently for a while their ultimate end (Fig. 7).

- (1) A coasting route, with probable cross-peninsular abbreviations, from the Straits of Gibraltar to Le Cotentin and thence across the English Channel to South-west England, and so up the Irish Sea and its coast lands. This route, according to Déchelette (save that he does not go into the questions relating to the British part of it), was in existence before the close of the Neolithic period. In speaking of the ornamental stone, Callais, he says² that it was used towards the end of the Stone Age, and 450 beads have been found in the dolmens of Le Morbihan; one bead has come from the Loire Inférieure, others from Portugal, Hautes Pyrénées, and Provence. This, so far as it goes, indicates a coastwise exchange and distribution.
- (2) The Amber Route across Central Europe to North Germany and Scandinavia and thence, probably, across Britain.

Whether the lure of Irish gold was or was not the factor that drew people to Ireland, it is interesting and important to know of the finds of Irish gold, for they illustrate the two lines of intercourse specially well (Fig. 7). Coffey³ gives the best list of gold lunulæ, supposed to be of the Irish Bronze Age:—

62 have been found in Ireland.

1 was found at Llanllyfni, Carnarvonshire, *i.e.*, on one of the western peninsular projections of Wales.

4 were found in Cornwall, 2 near Padstow, a port from time immemorial and, one may add, well known in connection with pilgrim traffic, 1 near Penzance, and 1 near Lesnewth.

3 were found in Le Cotentin (Tourlaville, Valognes and Montebourg).

1 was found in Côtes du Nord.

2 were found in La Vendée, south of the Loire.

All these suggest our western coasting route.

In addition, Lanarkshire has yielded 2, Dumfries 1, and Elgin 1; 1 was found in Luxembourg, 1 in Hanover, and 2 in Denmark. These suggest the cross-British routes mentioned in connection with the Beaker Makers. Peake⁴ discusses the route across England in some detail in correlation with other finds. Coffey⁵

¹ Coffey, G., *New Grange and other Incised Tumuli in Ireland*, 1912; *Bronze Age in Ireland*, 1913.

² Déchelette, J., *Manuel d'Archéologie*, t. i, p. 626.

³ Coffey, G., *Bronze Age in Ireland*, 1913.

⁴ Peake, H. J. E., *Memorials of Old Leicestershire*, 1911.

⁵ Coffey, G., *Bronze Age in Ireland*, 1913.

also instances the gold sun-discs of Ireland as further evidences of connection between Ireland and Scandinavia in the Bronze Age, while Déchelette was quoted above with reference to the spiral.

Allowing that lunulæ (*vide* Cornwall find) belong to the Early Bronze Age and, perhaps, that dolmens are even older, we hold the view that the cross-British route began early and lasted on through the second phase of the Scandinavian Bronze Age. Déchelette¹ makes an interesting reference to the Far West in his discussion of the Early Iron Age. He says that:—"Ces régions, la Grande Bretagne, le nord de la Péninsule Ibérique et la Gaule Armorique, c'est-à-dire les marchés et les entrepôts de l'étain aient lutté contre l'introduction du fer. En effet la première phase de l'époque de Halstatt n'est aucunement représentée dans toute la Gaule occidentale. La seconde, celle de poignards à antenne, a laissé des vestiges très nombreux dans la Gaule du sud-ouest et seulement des traces très clairsémées en Armorique. Dans l'état actuel des découvertes c'est seulement à l'époque de la Tène que cette dernière région apparaît comme définitivement acquise à l'industrie du fer."

This view is most interesting, for it suggests the separateness of the life of our west-coast route and the long local duration of Bronze Age conditions, giving opportunities for many developments of movement, of trade and of fashion. A summary of a few of these follows here:—

Crawford² draws attention to the distribution of flat celts along a line from North Wales to Christchurch on the Hants coast, while three celts have been found at Weymouth and one at Southampton—these are three likely ports for ancient trade. This line is related to our west-coast route.

Following Peake, he also traces another line from Warrington via the Peak District to Peterborough, then, perhaps, a port on what are now the Fens. This line is one of the cross-British series. One of Crawford's points is a difficulty with our hypothesis, and a difficulty we should not wish to slur over; flat celts, he says, are rare in Devon and Cornwall; we cannot but think that the gaps in his maps will be filled up as the records on which the maps are founded become more complete.

Munro³ notices various distributions along the Scottish portion of the west-coast route. Beehive huts are found in Harris and Lewis and the outer Hebrides, Skye, Mull, etc. Chambered cairns occur in Argyll, Inverness, Sutherland, Caithness, and on to the Orkneys, but they do not exist in sufficient numbers elsewhere to entitle them to be regarded as the representatives of the Stone Age burials of Scotland. Brochs occur to the number of 400 on the shores and straths of Caithness, Sutherland, Ross, Inverness, Argyll, and also Orkney and Shetland, while outside this region only 7 are known (Forfar 2, Perth 1, Stirling 1, Midlothian 1, Selkirk 1, Berwick 1).

¹ Déchelette, J., *Manuel*, 1913, t. ii, p. 552.

² Crawford, O. G. S., *Geographical Journal*, xl, 1912, pp. 184 ff. and 304 ff.

³ Munro, R., *Prehistoric Scotland*, 1899, pp. 326, 338–40, 389.

There are ruined "towns" with huts, etc., built of big stones, sometimes almost megalithic, at various spots along the west coast of Wales (Ty Mawr, Holyhead; Tre'r Ceiri, Lleyrn; Garnfawr, Pencaer, N. Pem.; Foel Trigarn, Prescely; St. David's Head, Carn Goch, etc.), while a related type is found on the hill sloping up to the Carneddau Hengwm on the Merionethshire coast, and smaller traces occur elsewhere also (Fig. 8). In almost every case these hut-towns have dolmens near them, and the association is probably more than accidental in view of the almost megalithic nature of the huts in some places. If it were not for this association, we should be tempted to link together these Welsh examples with those of the Scottish coasts.

Lewis¹ notices there is a West Scottish type of stone circle in addition to an Aberdeen type and an Inverness type. He also says that in South Britain it is only in Cumberland, Devon and Cornwall that there can be said to be groups of stone circles. There are circles in Wales distributed less exclusively near the coasts than the dolmens. Here, therefore, is another type of stone monument, this time of very problematic age, distributed along the west coast.

Coffey² believes that Iberian influence is discernible in some of the later types of bronze implements, such as double-looped palstaves; these palstaves have also been found in France and in South-west England. Anvils³ of bronze are well known among French finds, but only one has been found in the British Isles, and that was in Ireland. Here again, therefore, we get a glimpse of Bronze Age intercourse along the west-coast route.

The general conclusion which may, perhaps, be drawn, for the present, from this archæological review is that coasting trade probably developed considerably towards the end of the Neolithic Age and spread around Spain and thence to Western France and Le Cotentin, whence across to the Isle of Wight and Hampshire and so on, speedily finding its goal for some reason or other, perhaps the presence of gold, in Ireland. Along this way Ægean influences reached West Britain and Ireland.⁴ This line of intercourse was maintained for a long time, probably owing to the tin found in Brittany and the British Isles, and its "life" lasted on for a while after the Early Iron Age had begun in Central Europe. Whether the connection with the Ægean lasted on or not one cannot say, but probably with the coming of iron in that region it diminished, and what had formerly been the western end of a line of Ægean trade became a line of intercourse more or less independent of the Ægean. Perhaps the line from Brittany to Narbonne developed as a cross-peninsular route at an early stage of the coasting

¹ Lewis, A. L., "Stone Circles of Scotland," *Journ. Roy. Anthropol. Inst.*, 1900, p. 56.

² Coffey, G., *Bronze Age in Ireland*, 1913, p. 27.

³ *Idem*, pp. 27-28.

⁴ One might be inclined to think that the legendary importance of Brut the Trojan in Western Britain has a foundation of fact in connection with these movements, but it is important to remember, as against this, the likelihood that it was introduced into British story by monkish scribes naturally influenced by Virgil's setting of the legends of Rome, the mistress of the civilization the monks were concerned to spread.

intercourse—it may have been a line of movement of peoples long before this. (See p. 121.)

At some period, after the dolmen fashion had almost died out, one imagines this line of intercourse was extended northwards to the Hebrides, West Scotland, the Orkneys and Shetlands, and, as we shall see shortly, perhaps even to Norway.



FIG. 8.—DOLMEN AREAS IN WALES INDICATED BY OBLIQUE LINES, DRY-WALLED FORTRESS TOWNS BY CIRCLES.

The question marks refer to problematic dolmens.

The Beaker Makers.

At the end of the Neolithic period likewise came the Beaker Makers, formerly described as the Bronze Age race, across the North Sea, and they settled on the eastern side of the island, it would appear, putting out feelers, probably towards Ireland, but not reaching it in any numbers. Evidence is to hand of intercourse and trade along these cross-British routes, but we shall hazard the hypothesis that probably the western coastal zone (Irish Sea coast, etc.) was held by immigrants who may have come along the other route, so that the Beaker Makers found possi-

bilities of trade and not of settlement to any great extent. Flat celts¹ are abundant in Ireland; beakers, which are evidences of settlement, are hardly found at all. Britain was still forested very heavily, no doubt, and the immigrants on the east would find westward penetration through the forests difficult for anything more than small trading groups.

With the beakers have long been associated the broad-headed, strong-browed type, long known to archaeologists as the Bronze Age race, but better called the "Beaker Makers," or Borreby type, for we now think that these people reached Britain without a knowledge of bronze. The fact that Greenwell² and Rolleston discuss this type from several examples belonging to East Britain is further evidence in support of the view that these Beaker Makers came over across the North Sea.

The general description of them is that they must have been taller than the Neolithic British, averaging 5 feet 7 inches, rather strongly built, with long fore-arms and inclined to roughness of feature. The head was broad (skull index usually over 80, often 82 or more) and the supraciliary arches strong, but very distinctly separated in most cases by a median depression, and thus strongly contrasted with the continuous supraciliary ridges of, *e.g.*, Neanderthal man. The marked ridges often gave an appearance of savagery, which, however, was quite absent from the fine, yet very strong, Cowlam skull.³

Keith⁴ has discussed their possible survivors at the present day, and Beddoe⁵ did so before him. Beddoe noted the tendency to an aquiline nose in the type and found it among the Cumbrian dales. Keith notes the occurrence of the Beaker Maker type among some intellectual families, and instances the Darwins; there are probably several others. He thinks it was usually brown to fair in colouring at all periods, and this seems to be a very general opinion. Probably broad heads form a considerable portion of the present population of East Britain, and they are, perhaps, mostly fair, but their relationship to this particular type is by no means clear; we believe that there were "fair broad-heads" in most invasions down to Anglo-Saxon times. The marked characters noted above, at any rate, are not often found in East Britain, and it is broadly true that the race of the Beaker Makers has been swamped by others.

It may have penetrated into Wales, but, in the region of the larger plateau of South Wales it would be swamped, if anywhere. In the north, however, in the Bala Cleft of Merionethshire, we have noted a remarkable broad-headed, aquiline-nosed type with colouring brown to fair, and we provisionally connect this type, found in the Bala Cleft, where Neolithic types are scarce, with the Beaker Makers.

¹ See Peake, H. J. E., *Memorials of Old Leicestershire*, 1911, and Crawford, O. G. S., *Geographical Journal*, 1912, xl, pp. 184 ff.

² Greenwell, W., and Rolleston, G., *British Barrows*, 1877, *passim* (see also Parsons, F. G. *Journ. Roy. Anthropol. Inst.*, xliii, 1913, p. 550).

³ *ibid.*, pp. 586-7.

⁴ Keith, A., *Journ. Roy. Anthropol. Inst.*, xlv, 1915, p. 16.

⁵ Beddoe, J., *Races of Britain*, 1885, p. 250.

We cannot presume to guess when it was that these people (2 (c) in list) reached the Bala Cleft. They may be Bronze Age invaders (we know nothing appreciable of beakers here), coming probably rather late, because land ways into North Wales were very poor, while the lowlands were still almost impassable. They may be the result of some later invasion, or of trading settlers along this permanent line of movement.¹ They may even be connected with movements in historic or proto-historic times, such as the invasion of Cunedda. Whenever they came, their type is at least fairly clear, and, as usual, it is associated with independence of criticism and general intellectual and administrative power. The type should be looked for more in detail in Breconshire. It has not as yet been noticed there, except sporadically, and it is certainly not native to the valley of the Severn; these are the main "fair" regions of inland Wales. We think the type should be provisionally discussed as an Alpine-Northern cross evolved somewhere in Central Europe.²

The dark broad-headed type.

The western coasting route has not yet received sufficient attention, and ours is, so far as we know, the first attempt to associate a human type with it (No. 4 in list). We found our dark, stalwart, broad-headed men on certain coastal patches, often curiously associated with megaliths in Wales, and thence we set out to find the archæological correlations above mentioned. The fact that they connect West Britain and Ireland with the Mediterranean in the Bronze Age, and even, perhaps, before it began, is interesting in connection with what we have found concerning these stalwart, dark, broad-headed people, who do not show the brow-ridges of the other broadheads just discussed. (Fig. 7.)

We believe these dark broad-headed people occur on patches of rural coast, usually cliff-coast, in Wales as follows:—

The region of Llantwit Major—*i.e.*, the south side of the Vale of Glamorgan.

The south-west of Carmarthenshire.

Pencaer district in North Pembrokeshire.

The above districts are given from personal observation without many measurements or analyses.

Newquay, Cardiganshire (see pp. 78–79).

Ardudwy coast, Merionethshire (see pp. 88–97).

¹ It may be worth while to suggest that the hills and chases of the western Midlands offered an upland line of communication to near the Bala Cleft which cannot have been densely forested. From a branch of that cleft, through the Rhinog Mountains, have been built the "Roman Steps," which are quite possibly a Bronze Age trade route. They end, seawards, in the dolmen-country of Ardudwy. It is conceivable that this may have been a line of westward penetration of the Beaker Makers which attained to contact with the life of the west coast.

² But see von Luschan, F., "Early Inhabitants of W. Asia," *Journ. Roy. Anthropol. Inst.*, xli, 1911, pp. 221–244.

The above districts are given as a result of detailed analysis.

The Carnarvonshire coast.

This is given from some analysis supplemented by personal observation.

We have found the type in considerable numbers on the east coast of Ireland, round about Wicklow, but we do not think it is at all characteristic of the hill country behind the coast up towards Glendalough. On these points, however, much more work is needed. We think the type also characteristic of the Boyne, but we have only preliminary observations—we are more certain as regards Wicklow. The type is thus found on both sides of the Irish Sea—*i.e.*, in Wales and in Ireland.

Our friend, Mr. C. L. Walton, from his personal observation, assured us long ago of the presence of this type in South Devon and probably in Cornwall.

Ripley,¹ following Collignon,² shows that the coastal people of the gulf of Saint Brieuc, and especially the Iceland fishers, are more broad-headed than their neighbours, and from personal observation it may be stated that the type approaches that at present under discussion.

Around Narbonne also broad heads and dark hair are very noticeable. We thus have the stalwart "dark-broad" type at both ends of the "dolmen line." It might be identified, perhaps, along the line as well, but care would have to be taken to discriminate, if that is possible, between it and the less strongly built, but equally broad-headed Alpine stock, which is so important a feature of Central France.

Oloriz³ shows that broad-headedness is exceptional in the Iberian peninsula, but is found in two places. In the north-west it occurs in Asturias and around Oviedo. In the extreme south it is characteristic of the Andalusian coast from Motril to Moguer, with the exception of the city of Cadiz. In the latter case it does not extend far inland, and as a consequence it does not do much to increase the general average of cephalic indices for Andalusia.

Ripley⁴ says that the gulf of Salerno has a broad-headed population, which he seems to account for as a sea-borne colony, and he also has a photo of a dark broad-head from Ischia. The maps he gives indicate dark-colouring and breadth of head as characteristics of Salerno and the country across Italy, past the head of the gulf of Taranto to the region of Bari, on the Adriatic.

These distributions, the more interesting because they are the work of several observers quite unknown to one another and without any theory to prove, show that there is considerable reason to imagine a coastal series of settlements of dark broad-heads, stretching at least from South Italy to Ireland, perhaps both, via the Straits of Gibraltar and across France by the dolmen line.

¹ Ripley, W. Z., *Races of Europe*, 1899, p. 151.

² Collignon, R., *Bull. Soc. d'Anthropologie*, Paris, 1890, pp. 736-805.

³ Oloriz, "Distribucion geografica del Indice cephalica," *Boletin Sociedad Geografica de Madrid*, xxxvi, 1894.

⁴ Ripley, W. Z., *Races of Europe*, 1899, ch. x, pp. 246 ff.

Questions naturally arise as to the homologies of this type, and its distribution beyond the line here mentioned. If we had the type in Britain, by itself, we should be inclined to connect it with the general population of Central Europe, the dark, broad-headed Alpine type. We should, however, retain a little hesitation about this, as our type is sometimes of extraordinary strength of build and, while often fairly short, it is occasionally outstandingly tall; moreover, the hair is frequently quite black, and this is not on the whole an Alpine character. But, when we note the coastal distribution of this type, our hesitation is much increased, for the Alpine type has spread typically along the mountain flanks and its characteristic rarity in Britain is evidence of how little it has followed the sea.

We cannot but wonder also whether what Deniker calls the Atlanto-Mediterranean type is not a result of averaging these dark broads with the true Mediterranean type.

Seeking further distributional evidence, we find that dark broad-heads are highly characteristic of Dalmatia and may be an old-established stock, but it would appear that this region is famous for the height of the heads there, and our type is not specially high-headed. Broad-headed brunets¹ do, however, occur farther east in Asia Minor, the Ægean, and Crete, for example. Many are certainly hypsicephalic, but in others it seems that the brow and head are moderate and the forehead rather rectangular, as in our type.

We may thus tentatively picture a movement, perhaps of early traders from the eastern Mediterranean, prospecting as they went west, and making settlements here and there, notably at critical points like the Straits of Gibraltar and on the coasts of peninsular projections like Brittany, South-west England, South-west and North-west Wales. One is, of course, tempted to think that the coincidences between the distribution of our type and that of dolmens, for example, are too great to be fortuitous, and one cannot but wonder whether the prospectors, reaching Ireland, did not find the gold which made Ireland famous in the Bronze Age. But these remain mere guesses for the present, though an interesting recent paper by Perry,² states the case for a close relationship between the geographical distribution of megalithic monuments and ancient mines.

It is interesting that there should be evidence of our dark broad-heads, beyond the Irish end of the line now discussed, the line of intercourse which Déchelette, as quoted above (p. 130), thinks must be older than the Bronze Age. The chief evidences for the type beyond Ireland (Fig. 7) are:—

- i. Ripley³ shows that a dark, broad-headed element is present in Shetland, West Caithness, and East Sutherland. This is sometimes called the Old Black Breed.

¹ Von Luschan, F., "Early Inhabitants W. Asia," *Journ. Roy. Anthropol. Inst.*, xli, 1911, pp. 221 ff.

² Perry, W. J., "Relationship between Geographical Distribution of Megalithic Monuments and Ancient Mines," *Mem. and Proc. Manchester Lit. and Phil. Soc.*, vol. 60, No. 1, 1915.

³ Ripley, W. Z., *Races of Europe*, 1899, p. 309.

- ii. Arbo¹ finds the coast and the external openings of the more southerly Norwegian fjords have a broad-headed population, whereas the inner ends of the fjords and the interior are more dolichocephalic. The broad-heads stretch from Trondhjemsfjord southward, and from their exclusively coastwise distribution he supposes them to have come across from the British Isles.

The population is darker than that of the rest of Norway and its area of distribution, as Dr. Stuart Mackintosh has kindly pointed out to us, is, like that of the same type in the British Isles, characterized by a pelagic climate.

We have noticed above that various archæological objects are distributed along the Hebrides-Shetland extension of our west-coast route and some of them, like the dry-masonry constructions and the brochs, seem to belong, on the whole, to a period later than dolmens, etc., so we may have here a subsequent extension to South-west Norway. Be it noted that this is a region quite unconnected with that of the Scandinavian dolmens or gold trade or bronze finds, which are mostly from South Sweden and Denmark.

We note next, in order not to avoid difficulties, that Ripley² refers to a broad-headed type in Jutland which, however, he follows Dr. Beddoe³ in ascribing to the same stock as the Beaker Makers or so-called Bronze Age Race, from which we at present feel justified in dissociating our dark broad-heads. Beddoe⁴ also speaks of the broad-headedness of the people of Beveland, in Holland, who, he suggests, may be remnants of an ancient population driven into the low islands by the Batavi or by still earlier invaders. Ripley⁵ likewise speaks of the same type in Nord and Zuid Beveland, on the inner islands of the Rhine mouth, but notes that, along the outer coast, the fair more or less Nordic type spreads everywhere, as along the Litus Saxonicum generally. Ripley associates these people with the Alpine stock, and certainly the Walloons are not far off. Moreover, this distribution does not force one to think of these people spreading to Britain. On the whole, therefore, we are inclined to dissociate the Jutland and Beveland brachycephals from our dark broad-heads, and we do this the more readily because, so far as we know, dark broad-heads are not characteristic of the east coast of Britain, apart perhaps from recent immigrants in the cities. At the same time we would point out that if there is kinship in gold lunulæ, dolmens, etc., between Ireland and the North German plain, there is a possibility of our dark broad-heads having drifted across in either the one direction or the other, always provided that this type did come into Western Britain in the Bronze Age.

¹ Arbo, C. O. E., *Ymer*, Stockholm, 1900, p. 25.

² Ripley, W. Z., *loc. cit.*, pp. 211-12.

³ Beddoe, J., *Races of Britain*, 1885, p. 16; also Beddoe, J., *Anthrop. Hist. of Europe*, second edition, 1912, p. 141.

⁴ Beddoe, J., *Anthrop. Hist. of Europe*, 1912, p. 110.

⁵ Ripley, W. Z., *loc. cit.*, 1899, pp. 297-9

To sum up, towards the latter part of the Neolithic Age, influences and perhaps immigrants affected Britain and Ireland, coming from the south, perhaps around Spain, perhaps across France. At about the same time, other influences from the Rhine and the Low Countries, this time indubitably accompanied by immigrants, reached the British coasts. The latter immigrants survive in all probability in locations quite distinct for the most part from their primeval ones, localities where, so far as can be judged, there had been but slight opportunity for Neolithic settlement; perhaps it is for that reason that the later comers were not swamped by resurgence of the indigenous stock. The former immigrants, those from the south, on the other hand, came at some period as yet quite unfixed; a certain amount of similarity between their distribution and that of dolmens is suggestive but not conclusive. The fact, however, that they form an important part of a rural fisher-farmer population in nearly every case, and are not related to modern ports, indicates that they are an old-established population. Also, as the route indicated by the series of their locations is apparently the route followed by coasting trade of the Bronze Age (or rather late Neolithic—Early Iron Age, at least), one may imagine that these dark broad-heads came at some time during that period. Moreover, they would seem to have spread up to Shetland and Norway at some quite remote period.

It is quite probable that, when more archæological finds have been mapped, fresh correlations will appear, which may show that more waves of influence reached these islands during the Bronze Age, but at present little is known concerning local movements of peoples between the Early Bronze Age and the Early Iron Age.

Another possibility regarding the dark broad-heads is that they might be the "Black Danes" mentioned in some of the chronicles, but these terms were loosely used and give no indication of the place from which the sea rovers included under it had come. It is also possible, as Professor Boyd Dawkins has pointed out to us, that the term "black" might refer to the colour of their ships, or their garments, or might be otherwise adventitious. It is difficult to imagine that coastal communities in so many places with such multifarious evidence of long establishment are due to this type of invasion, and one may remember that there may have been enough dark broad-heads from Arbo's coastal zone in Norway (see above) to give ground for the term "Black Dane" without there having been enough to create all these settlements.

We have, further, to say on this subject that our dark broad-heads seem distinct from those found in Sussex, for example. These latter may be the result of immigration from Normandy, a view which we believe Dr. Beddoe held.

Parsons¹ has published a most interesting and valuable account of crania disinterred at Hythe. They are probably mediæval, and show an extraordinary number of broad-heads, with skull-breadth-index over 80, and cephalic index on

¹ Parsons, F. G., "Hythe Crania," *Journ. Roy. Anthropol. Inst.*, xxxviii, 1908, p. 419.

the living head, therefore, probably, 81·5 or more. In only a very few cases did the glabello-maximal length of those skulls reach or surpass 191 (equivalent to about 200 on the living head). The Hythe series is thus very different from any Welsh series of modern times, even in the regions such as Ardudwy, where broad-heads are comparatively common. Beddoe¹ refers to names, etc., on skulls in Hythe Ossuary as showing Norman-French immigration.

Parsons' Rothwell series² is of a more average character, but is still different from a Welsh group; the more extreme measurements seem better represented, while the broad-heads reach the proportion that they do only in some of the broadest-headed districts in Wales. They suggest the persistence of distinct stocks side by side.

We have no guide as to pigmentation of these mediæval people, and that stands in the way of closer comparison of Parsons' results with ours for the time being, though we hope it may be possible to define race types in increasing detail and thus to bring the two lines of work closer together.

The two broad-headed stocks whose distribution we have discussed seem to be connected, in part at least, with Bronze Age movements. In the one case, we judge that the type in question is a refined modification of the Beaker Maker type, well known from sepulchres of the Bronze Age, but we do not know when it reached Merionethshire. In the other case, we imagine from coincidences of distribution that the type spread up the Atlantic coast as far as Ireland and Wales, somewhere between late Neolithic and perhaps post-Bronze-Age days, and, either then or afterwards, went on via the west of Scotland to Shetland and Norway. We judge this to be the case, because it was especially in Bronze times that this route was so important. The export of tin may even have died down by Roman times.³

Early Iron Age Movements.

Of Early Iron Age movements we know little from the point of view of physical anthropology, so any suggested correlations are strictly tentative.

It is generally agreed that iron did not reach Britain till the period of La Tène, and Rice Holmes⁴ gives a useful statement of the argument which tends to show that the Belgæ came two centuries or so before the Christian era and that they were, perhaps, preceded by other Brythonic-speaking as well as iron-using tribes, whose date may be about 400 B.C. These people are described as being tall and stalwart, with fair or red hair, and their civilization must have been of a high order, in some respects at least.

We cannot but recall that it was probably in the Early Iron Age that the lower Rhone valley became a highway (see p. 120). It thus suggests itself to us, as we believe it has to Peake, that, with their sharp iron tools, men were at that time

¹ Beddoe, J., *Races of Britain*, 1885, p. 256.

² Parsons, F. G., "Rothwell Crania," *Journ. Roy. Anthropol. Inst.*, xl, 1910, p. 483.

³ Holmes, T. Rice, *Ancient Britain*, 1907, pp. 251-2.

⁴ *op. cit.*, pp. 231-4.

effectually attacking the forest and so making a way from West Switzerland and Burgundy on the one hand, down through the forested Rhone valley to the Mediterranean, and, on the other through the forests of Northern Gaul towards Britain.

It is probable that this life of the Early Iron Age developed in East Britain while the old life and coastwise intercourse continued on the West, for we find the distinction of East and West persistent from the Bronze Age on to the present day. If, however, we are right in thinking that this period saw efforts to cut through the forest and to destroy it, we may think of the hillside roads of our country as beginning to develop, and we may also think of the Brythonic iron-using people as spreading along the valley sides, *e.g.*, from the East and Midlands, perhaps, via Severn and Wye into Wales. Holmes concludes, apparently with justification, that Cranbourne Chase was unaffected by the "Early Iron Age" before Roman times, and that Lancashire was also untouched (as regards its isolation, see also p. 126), so it is probable that Wales also was little affected by iron before the Roman day, unless the coastwise intercourse had brought it in, which is somewhat doubtful.

If, therefore, the Early Iron Age people of East Britain were the first speakers of Brythonic languages to reach Britain, it is quite possible that the Brythonic¹ languages did not reach Wales much before Roman times. That is, however, far more than it would be wise for us to assume, for we as yet can hardly make more than guesses about the earlier language. We suspect that it was a Celtic language, but cannot decide whether it was of a Gaelic¹ (Goidelic) type. The two groups of Celtic languages are, after all, neo-Celtic, and we must be wary in transferring their present differences back into pre-Roman times.

We are, on the whole, inclined to speculate that, perhaps through Roman pressure, perhaps earlier, Brythonized dwellers in what are now the English Midlands spread along the valleys towards Wales, using, naturally, the Severn and Wye.

All Wales speaks Brythonic dialects, and has done so for many centuries, no doubt, but the distribution of the dialects, according to Sir John Rhys and Sir D. Brynmor Jones, is most interesting. They² show that the Powysian dialect occupies the Severn and Wye basins for the most part, especially the former—at least where it has not been displaced by English. They also urge that it displaced an older dialect, Ordovician they call it in one place, though without emphasizing the name. This older dialect they find in the district around Bala, the Berwyn Mountains and the Dee—*i.e.*, in the wild moorlands of North Montgomeryshire and in the deep protected valleys over their high northern edge. They find it also in the north of Cardiganshire, around Aberystwyth, while Powysian has spread across

¹ The Brythonic group includes Welsh, Cornish, and Breton. The Gaelic group includes Erse, Manx and Highland Gaelic.

² Rhys, Sir John, and Brynmor Jones, Sir D., *The Welsh People*, 1900, p. 8 and ch. I generally.

the watershed from Caersws towards Machynlleth and thence into West Merioneth (Fig. 9).



FIG. 9.—MAP ILLUSTRATING RHY'S AND BRYNMOR JONES' VIEW OF THE DISTRIBUTION OF DIALECTS OF WELSH.

V = Venedotian. Or. is what they have called Ordovician.
 P = Powysian.
 D-S = Demeto-Silurian.

The spread of dialect, of county administration, of styles in houses and furniture, etc., over that watershed to Machynlleth is an interesting detail of Welsh geography. The barrier of Borth Bog has usually stopped the further advance of Montgomeryshire, and south of it we are definitely in Cardiganshire. The Aberystwyth district, down to the River Wyre, however, keeps the dialect which Rhys thinks was pressed out of Montgomeryshire, perhaps through the Plynlymon passes as well as along Dyfi-side, by the advance of Powysian. The discontinuous distribution of the old dialect, if confirmed, suggests, like all such distributions, an earlier continuous one, and that implies its possession of much of what is now Powys.

If Rhys is right, there is thus evidence of advance of a dialect up the Severn and Wye valleys, but, as we have said before, all Welsh dialects are Brythonic, and it would be going too far to argue on this basis alone that Brythonic speech first advanced up that way, and found a Gaelic tongue in possession of the country.

Supposing, however, that the Early Iron Age¹ men were the first to use Brythonic in Britain, we may surmise that they and their speech did reach Wales at some time not very distant from the Roman invasions, and that they displaced or transformed older Celtic tongues in Gwynedd and Dinefawr, if they advanced via Powys. Distribution of place-names hints that at some time Brythonic folk gave the name of "Gwyddel" to people they met, and perhaps fought, in Gwynedd and Dinefawr. This implies some consciousness of a difference in speech, perhaps, but authors doubt whether the term means more than "foreigner."

It is of great interest that Edward Lhuyd argued long ago for the existence of a pre-Brythonic Celtic language in Britain from the occurrence of *Asc*, *Esc*, *Isc*, *Ax*, *Ex*, *Ux*, and so on in river-names. He derived these terms from *Uisge*, a word in the Gaelic languages for water, and a word which is never used in Welsh, Cornish, or Armorican. We thank our friend Mr. Richard Ellis, Meyrick Fellow of Jesus College, Oxford, for communicating this.

If the provisional hypothesis of the introduction of Brythonic with the Early Iron Age be allowed, the guess that the previous language was also Celtic is defensible. The Gaelic languages probably represent, in modified form no doubt, a Celtic more anciently insular than the Brythonic. With what we have suggested about coastwise intercourse along West Britain and the Irish shores in the locally long-drawn-out Bronze Age, it will also be agreed that the dialects on the two sides of the Irish Sea may have been akin, and it is Gwynedd and Dinefawr that are here concerned. (Note locations of dark broad-heads, of dolmens, of dry-walled fortresses.) In the old romances also it is Gwynedd and Dinefawr that are most concerned, and Ireland is often mentioned.

The simpler, more local, folk-tales refer in many cases to the contact between valley-people using iron and upland folk in a pre-iron stage of culture. There is as yet no authoritative collection of such tales, but a study of the place-names in a large number shows that they are mostly located in Gwynedd and Dinefawr, and that they gather especially around the smaller moorland sites (*e.g.*, in Carnarvonshire). This suggests (and the folk-tales repeatedly bear out the suggestion) that the upland folk on these small moorlands shrank away from the Iron Age invaders and made mystification a defence, as small communities have so often done elsewhere (*e.g.*, the Vaudois in their struggle with Piedmont).

¹ There is an absence of evidence on this point as regards any introduction of iron along our coastwise route, and an *a priori* improbability of its introduction along a route which was the conservative stronghold of the Bronze Age life. On the other hand, all evidence points to introduction of iron via south-east and east England, and the probability is that, coming from such a direction and being able for the first time in the human history of our region to use the valley sides seriously, it would advance into Wales via Powys. A Brythonic dialect would advance with it in that case, whatever the earlier language.

In the folk-tales, it is true, the people are called *fairies*, but colouring is mentioned only in one case—that of a trader from the sea who is said to be fair (*i.e.*, fair hair) is treated as something worthy of special mention. The fairy children (changelings) are always described in such a way as to suggest that they were dark and that they were the children of the Upland-folk of our hypothesis—*i.e.*, mostly of Mediterranean race. In the romances the princes and princesses are said to be fair, as though that were exceptional. Our friend, Mr. J. H. Shaxby, draws our attention to the probability that the word fair in “fairy” and “fair-folk” does not refer to physical traits, but is an adulatory term such as men so generally use in describing beings about whom their superstitions gather.

It is possible that, when Welsh folk-tales have been more completely collected and classified, the foregoing statements may be found to need adjustment. They are, in the main, a development of the late Sir John Rhys’ suggestions in his *Celtic Folk-lore*—a development due in large part to that increased correlation of human and archæological studies which his public as well as his private work has done so much to encourage.

On the whole, it will be seen, we are at present inclined to think of a Brythonic advance into Wales—probably via Powys—at some time not remote from the Roman invasion of Britain. It may have been in waves pushing back old Celtic languages or dialects,¹ which were probably nearer to the Gaelic group than is Brythonic. That Wales and South-west England were mainly Brythonic in Roman times seems to be indicated by the fact that it was Brythonic that was taken to Armorica by immigrants from the West from 450 A.D. onwards.²

As regards physical type, we note a characteristic increase of the fair, medium-headed type (2 (*b*) and 2 (*a*)) as we descend the hills to get into the Severn basin or that of the Wye—*i.e.*, into Powys—and all through this region, and the Welsh border generally, there is a suggestion of dilution of pigment in the Neolithic or Mediterranean type. Whether the fair type may be correlated with the Brythonic invaders is doubtful: it may be due to later infiltration. On the other hand, however, Wales has for a long time been an exporter of men in the main, and it is not impossible that the present valley-folk may be in considerable measure the descendants of those who made these valleys human locations.

As we have spoken of language, we may be permitted to remark that it is perhaps not necessary to assume the Gaelic nature of the ancient Celtic all over Britain. The suggestions that have arisen in the course of our study of Bronze Age matters, however, make it possible, in our opinion, that with the coastwise

¹ Our friend and colleague, Mr. T. Gwynn Jones, M.A., tells us that in some ancient Welsh poems “Bryneich” is used in a general sense for enemies or strangers after having been used in a more special sense in earlier poems. The Erse use *Breathneich* for foreigner and give that name to Welsh people living in Ireland. Mr. Gwynn Jones’ suggestion is that Brythonic-speaking people may have got the term either by inheritance from Goidelic-speaking ancestors or by borrowing it from neighbours in Wales, who spoke a dialect akin to Goidelic. We wish to thank Mr. Gwynn Jones for this suggestion and for much help.

² Loth, J., *L’Emigration bretonne en Armorique*, Rennes, 1883, *passim*.

intercourse so often mentioned may have been associated, on both sides of the Irish Sea, an ancient Celtic which may have been in some sense the precursor of the Gaelic tongues. In other words, we do not feel bound to assume that the Gaelic languages proper were ever spoken in the eastern part of Britain, nor do we feel bound to accept the Zimmer view that they were not spoken in the west. Anthropology and Archæology both insist that there are other waves besides those from east to west. Zimmer¹ and Kuno Meyer go much farther and say that Gaelic languages spread from Gaul to Ireland direct and that they were not used in South Britain before Roman times. In this respect their view conflicts with that of Lhuyd and Rhys. We have mentioned this controversy with reluctance, but in the hope that thoughts suggested by anthropological and archæological work may be of some use to linguists and that their counter-suggestions may shed new light on our still unsolved problems. Zimmer² also urges the existence of direct trade relations between West Gaul (Loire and Garonne) and Ireland in the first century A.D. and the last century B.C. as well as later on.

Reverting to physical types of men, we think that the fair-haired, light-eyed men of the Severn and Wye valleys often have medium to broad heads (2 (b)), and that many men in Eastern England also show these characters. It is probably difficult to tell Brythonic types of pre-Roman times from Anglo-Saxon types of post-Roman times, and we are inclined to believe that in both these regions we may have contributions from both these movements of peoples, *i.e.*, it is not safe to assume that a fair man in East England is necessarily a representative of the post-Roman invaders and of "Teutonic" stock. He may be a Brython, and it is doubtful whether it will ever be possible to separate these two elements satisfactorily, though we may conjecture that long-headedness was more common among the post-Roman invaders than among the pre-Roman ones.³ There is at least a possibility that pre-Roman peoples are fairly well represented even in East England, and, if this be so, we need to consider how then the great contrasts between England and Wales have come to pass.

Before discussing this problem, however, it is necessary to mention that we probably have evidences of late-Roman and post-Roman movements in Wales which perhaps affected the population in certain areas.

Notes on Later Movements.

It is generally accepted that the northern and western parts of Britain, retaining their Neolithic population with some Bronze Age admixture, and receiving

¹ Zimmer, H., and Kuno Meyer, "Auf welchem Wege kamen die Goidelen vom Kontinent nach Irland," *Abhandl. königl. Preuss. Akad. der Wissenschaften*, 1912.

² Zimmer, H., "Ueber Handelsverbindungen Westgalliens mit Irland," *Sitzungsberichte der k. Preussischen Akad. der Wiss.*, 1909, p. 377; 1910, p. 1098, etc.

³ The above statement is ventured, though we are aware that several writers (*e.g.*, Leeds, E. T., *Archæology of Anglo-Saxon Settlements*, p. 25, Oxford, 1913) would claim that the Anglo-Saxons were physically very different from all previous inhabitants of Britain. Neither view has, as yet, sufficient evidence in favour of it.

the onset of the Early-Iron-Age people along the valleys, at some time not very distant from the Roman invasion, were still in a condition to hold out strongly against the Romans. Haverfield,¹ in fact, believes that they never were really Romanized at all. The Romans opened up and guarded lines of communication, built camps, developed exchange with the people and so on, but seem to have remained apart from their life. The local language doubtless borrowed much from Latin, but it did not become effete, a mere patois of kitchen, farm and workshop, as it did, when it did not entirely disappear, on the English plain. It is likely that, towards the end of Roman times, many men followed Maxen Wledig away from Britain, and that wealthy folk left the country as security diminished. The population of the English plain would thus be much weakened intellectually and linguistically: its Latin would be little better than what one might call "pidgin Latin," and so its people would be fairly easily won to a new language; it was otherwise in the west. In picturing the drift away from Britain we may remember that even in the non-Latin regions,² probably owing to raids of Picts and Scots upon the weakened Roman protectorate, the leaders seem to have streamed away to Armorica (A.D. 450-500) with bands of military associates. Budinsky³ makes another point. He does not think it likely that Anglo-Saxon would have ousted Latin effectually, and draws the conclusion that the Anglo-Saxons found a Celtic language in possession.

Haverfield⁴ evidently believes in a Celtic revival in the fifth century, when the Romanized area was cut off from Rome, and its nearest neighbours were the less Romanized British districts of west and north. Leeds⁵ thinks that the Roman towns of Wroxeter and Chester were destroyed by hill men issuing from Wales long before Angles or Saxons reached such distant parts. Haverfield wonders, from analogy with conditions in Bukowina, whether even on the English plain the peasantry may not have remained largely Celtic, borrowing Latin words in their dealings with the Roman authorities for provisioning the army and so on.

Gomme⁶ has stated a case for the survival of Romano-British London until such time as it could enter into the Anglo-Saxon polity by agreement, and he mentions Roman survivals in the customary law of London down to the eighteenth century. Haverfield looks upon this view as a product of generous enthusiasm. Leeds accepts something of Gomme's view in a measure, but claims, on archæological evidence, that Saxon immigrants must have made full use of the Thames route unhampered by London. They utilized the south side of the river, leaving the extensive forest of the London Clay and the boulder clay on the north, and, he claims, they reached Wessex along this route.

¹ Haverfield, F. J., *Romanization of Roman Britain*, pp. 24, etc., 3rd edition, Oxford, 1915.

² Williams, Hugh, *Christianity in Early Britain*, pp. 283-4.

³ Budinsky, *Die Ausbreitung der lateinischer Sprache*, Berlin, 1881.

⁴ Haverfield, F. J., *The Romanization of Roman Britain*, 3rd edition, 1915, Oxford, *passim*.

⁵ Leeds, E. T., *The Archæology of the Anglo-Saxon Settlements*, 1913, Oxford, *passim*.

⁶ Gomme, Sir G. Laurence, *London*, 1914.

Without wishing to enter into the controversy, it seems to us that Leeds' position is a reasonable one, and perhaps it does not necessitate a belief in the utter desolation of London, for the Saxon immigrants apparently avoided towns and Roman roads.

In any case it is interesting to notice that in the wild forest country north of the Thames, backing upon the Chilterns, the Neolithic types have survived in characteristic fashion, and this appears to be a region with several peculiarities, as, for example, the lack of any need for Enclosure Acts in the eighteenth century.

Leeds adds archæological evidence for the general belief that the struggle¹ between "Saxon" and "Celt" in Wessex was a long and hard one, marked by many vicissitudes of fortune. It is thus in the highest degree improbable that the Romano-British population here was ever exterminated.

To sum up thus far as regards the population of South Britain:—

In most parts there would be a Neolithic foundation.

In Merionethshire, Cumbria, and perhaps elsewhere, and also among some of the old intellectual families, one would find the Beaker-Maker type.

Along the west one would find the dark broad-heads.

In East England one would find many medium-to-broad-headed fair people of either Brythonic or Anglo-Saxon stock, probably of both. They would also be found in Powys.

In the estuarine lands, using these terms broadly, of both east and west, as we shall next develop, would be Nordic types (2 (a)) now speaking English in most places but Welsh in others, just as some of them speak Breton in Brittany.

The contrast between England and Wales we may put as follows:—Owing to the circumstances of the Roman and post-Roman period, the languages of Anglo-Saxon invaders triumphed over native speech, probably in spite of a very considerable survival of British people, and thus the English plain now represents a later phase of the British (or should we call it the Anglo-Celtic? ²) tradition; the Welsh hills represent an earlier one. Doubtless both are really rich in pre-Celtic survivals, could we but separate and identify them.

There seems little doubt that, as the Roman hold weakened, invasions from Ireland, probably in search of metals from mines worked under Roman orders, affected Wales, and especially, perhaps, Gwynedd and Dinefawr. It is quite

¹ Major, A. F., *The Wars of Wessex*, Cambridge, 1913.

² If the expression of a personal opinion may be allowed, it is that the accepted term should be British, as "Anglo-Celtic," though so much more correct than Anglo-Saxon, has neither the comprehensiveness nor the romance of the better known and rightly honoured "British." To use and to take pride in the term British would help us to get back to the broad Elizabethan attitude, so much richer and more artistic than that which was in fashion in the Victorian period.

possible that the "Gwyddel" place-names referred to above (p. 145) are really reminiscences of these invasions, as the Oghams seem also to be. A little later, again, there was much peaceable intercourse between Ireland and Dinefawr, and the promontory of St. David's offered a series of alternative landing-places for small craft. It is probably at a suitable and fairly fertile spot, focal for these landing places, and near a site of prehistoric sanctity and renown, that the Christian centre of St. David's developed. The peaceable intercourse of the Saints led from Ireland past St. David's, along the South Wales coast, to south-west England and Brittany, *i.e.*, more or less, our old western coasting route reappears as an important vital fact once more, and that during a period of disturbance on the east.

One must not forget this Ireland-to-Wales movement, even in connection with the dark broad-heads discussed for both sides of the Irish Sea in an earlier section of this paper. As regards this, however, post-Roman movements can hardly account for the distribution of dolmens, gold lunulæ, dry-walled towns and so on, and the coincidences of distribution of several of these make it more probable that the dark broad-heads belong to the earlier rather than to the later movements.

It is worth noting that in some parts of Dinefawr, notably in Mid-Cardiganshire back from its open and approachable coast, there are numerous fair people with rather broad heads and fairly frequent red tendencies. Whether these are incomers (of some period) from Ireland, as is sometimes imagined locally, is a doubtful point; but of the existence of these people, and of a certain resemblance to Irishmen of fair types, there is little doubt. Our map-register (Fig. 1) and analysis of Mid-Cardiganshire may be consulted (pp. 82-83 and 118).

The occurrence in Wales of Nordic types, like those just mentioned but showing every evidence of kinship with Scandinavia, has already been noted in several places. Pembrokeshire and Gower doubtless received a strong infusion of new blood, and the Celtic languages have had to retreat to the hills; their boundary should be mapped with greater precision. In South Cardiganshire, however, at Newcastle Emlyn (see pp. 77-80) types which are obviously Nordic have become Welsh-speaking.

The estuaries and inlets of East Britain received a strong Nordic infusion between Roman and Norman times, and behind the meagre historical data of those times we see the conflict between the estuarine kingdom of Deira, round about the port of York, soon in the hands of the invaders, and the British kingdom of Elmet in and above the forest of the moorland slopes in the West Riding. We also see westward movements of Celtic-speaking warriors, probably under pressure from the east and the sea, and note especially the legendary conquest of great tracts of Wales by Cunedda and his sons. Some would ascribe the settlement of our Bala-cleft type in its present location to this movement, but we think the matter must remain more indefinite for the present, though we recognize that the type is closely connected with a Cumbrian stock.

In the first stages of Norman interference with Wales, one seems to see an

(See references on pp. 113-118.)

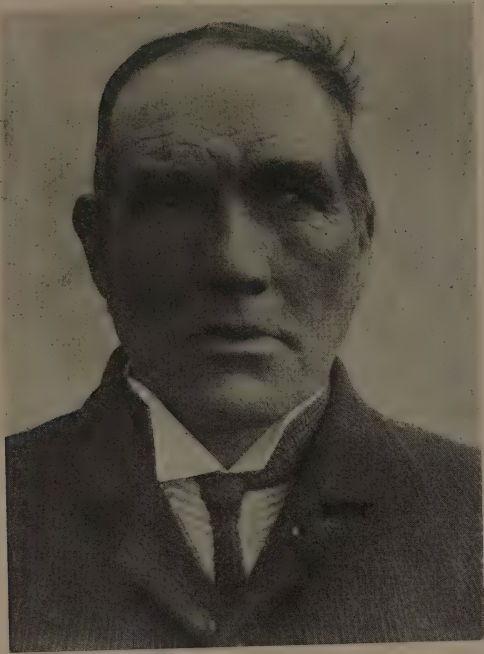


FIG. 1A.

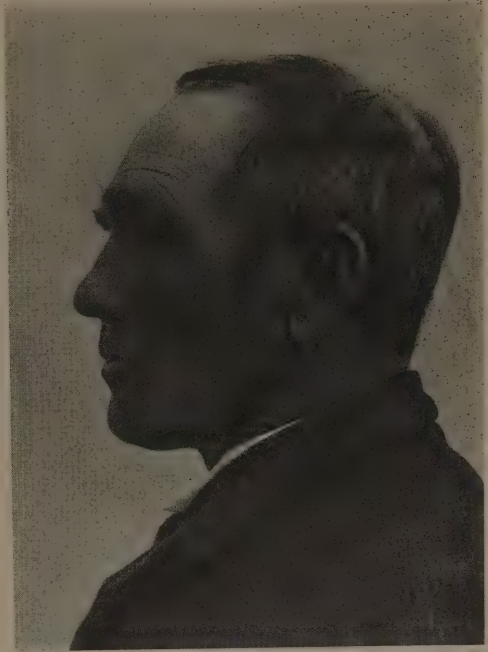


FIG. 1B.

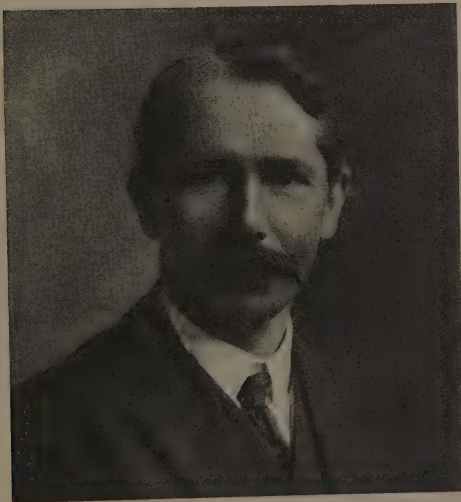


FIG. 2A.

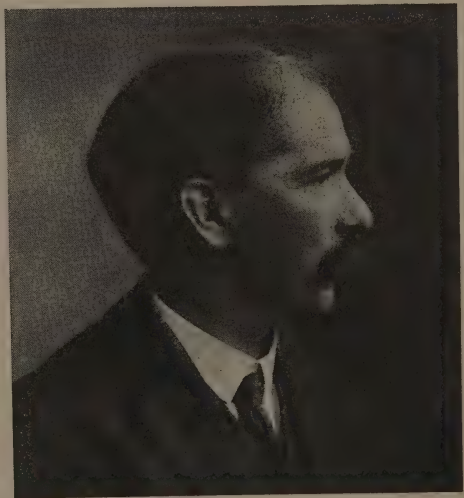


FIG. 2B.

GEOGRAPHICAL DISTRIBUTION OF ANTHROPOLOGICAL TYPES IN WALES.

(See references on pp. 117-118.)



FIG. 1B.



FIG. 1A.

GEOGRAPHICAL DISTRIBUTION OF ANTHROPOLOGICAL TYPES IN WALES.

(See references on pp. 116-118.)



FIG. 1A.

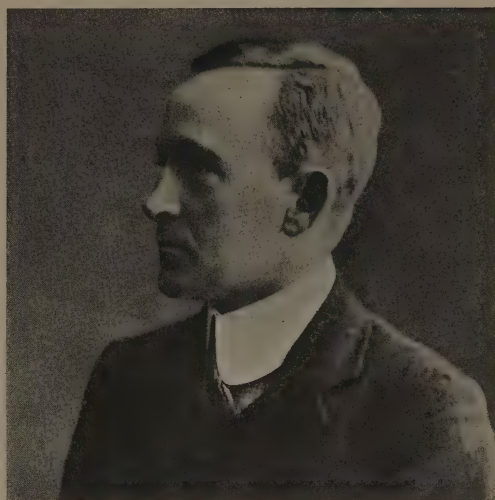


FIG. 1B.



FIG. 2A.



FIG. 2B.

GEOGRAPHICAL DISTRIBUTION OF ANTHROPOLOGICAL TYPES IN WALES.





FIG. 1.—NORDIC TYPE.
COLOURING FAIR, HEAD NOT BROAD.



FIG. 2.—BROAD-HEADED BROWN-
AUBURN HAIRIED TYPE. TOWYN.
(BEAKER-MAKER TYPE.)



FIG. 3.—RATHER BROAD-HEADED FAIR TO
REDDISH TYPE FOUND IN MID-CARDIGANSHIRE,
AND ELSEWHERE IN S.W. WALES.

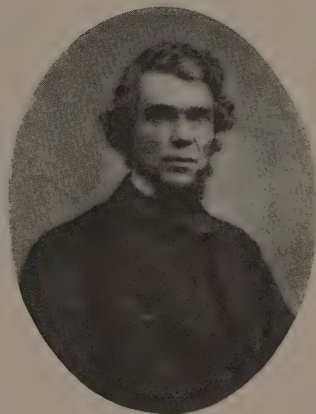


FIG. 4.
(Reproduced from a photograph by
Dr. J. Beddoe.)



FIG. 5.
(Reproduced from photographs by Dr. John Beddoe.)

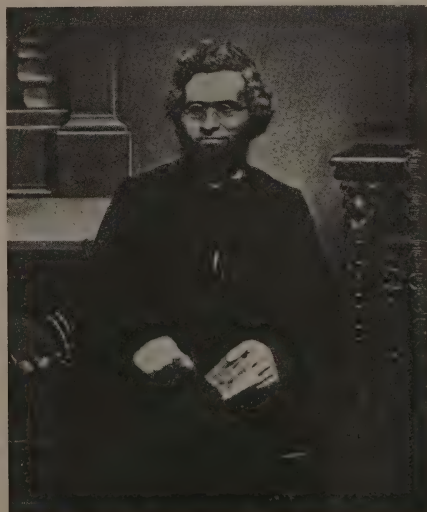


FIG. 6.

(See references on pp. 113-118.)

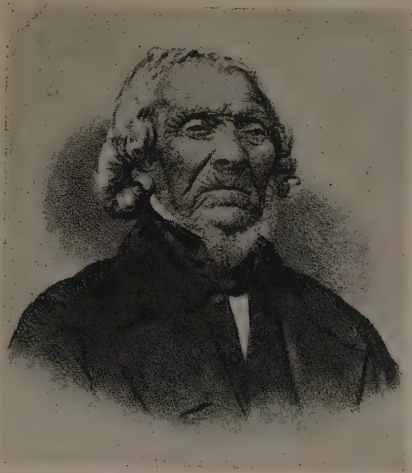


FIG. 1.—BEDDOE'S PURE BASQUE.

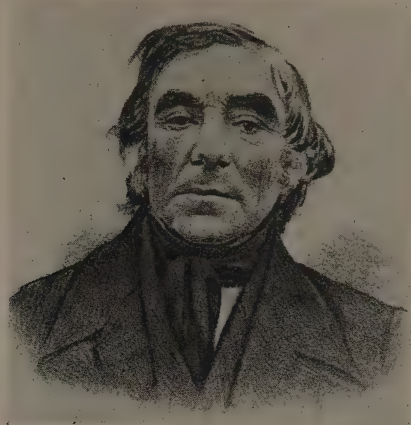
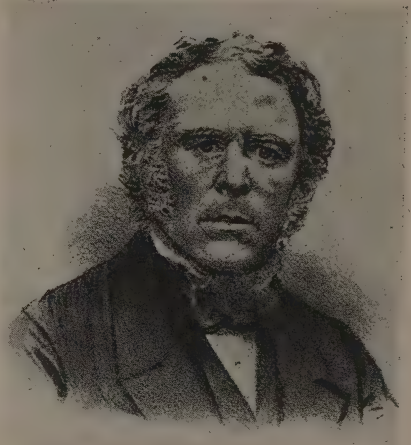
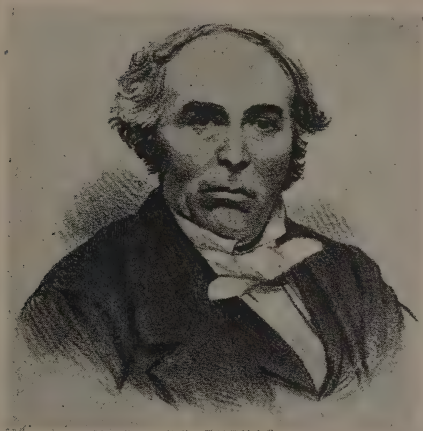
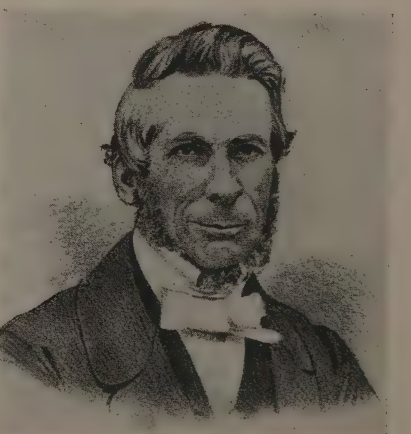
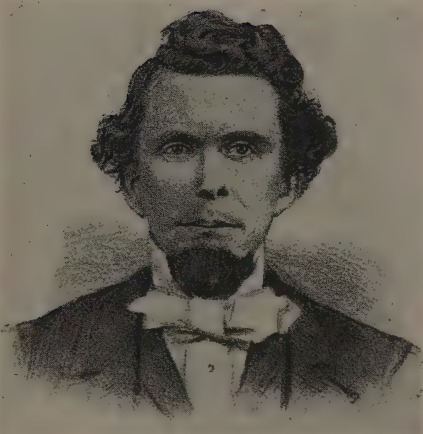


FIG. 2.—BEDDOE'S BASQUE.

(Our type 1 (a), p. 115.)



FIGS. 3 AND 4.—BEDDOE'S CYMRO-BRONZE.
(Our type 2 (c) or perhaps 2 (b).)



FIGS. 5 AND 6.—BEDDOE'S BASQUE-IRISH. (Probably our type 1 (a) or 1 (c).)

Reproductions from a series of illustrations labelled by Dr. J. Beddoe and his friend, Dr. Davies of Bristol and Aberceri, Newcastle Emlyn, Cardiganshire. The illustrations depict ministers of one of the religious bodies in Wales in the middle of the nineteenth century, and the series is being deposited in the collections at the Royal Anthropological Institute, through the kindness of Mr. and Mrs. R. G. Heaven of Aberceri.

GEOGRAPHICAL DISTRIBUTION OF ANTHROPOLOGICAL TYPES IN WALES.

attempt to control and keep open lines of communication, perhaps much the same kind of effort as the Romans made, but with less regard to mines and mining. The penetration in both cases is largely via Powys and via North and South Wales coasts, and we are probably not far wrong if we transfer the broad scheme of penetration of Roman and Norman and apply it also to the penetration of invaders of the Early Iron Age, allowing that these earlier conquerors soon penetrated more intensely than the later ones. They were working under pressure from the east, the others were conquerors anxious mainly to keep Wales quiet.

With the Normans, we get settlements of Flemings in South Wales, again probably Nordic or Alpine-Nordic types, and the establishment of the lines of castles, some guarding the small havens, others the roads. Their development was doubtless related to the gradual subjugation of the native population which gathered on higher ground in most cases.

Of later settlers, we have mention of Huguenots in weaving districts like Montgomeryshire and Carmarthenshire, and perhaps more than one settlement from Ireland, but it is not possible at present to do much towards the identification of these smaller elements as regards physical type in Wales or England, and this survey of the main constituents of the population of South Britain must be closed. We hope we have shown what interest there would be in a really detailed survey of English types, and we have endeavoured to remember that, till this is achieved, many of our results must remain provisional, even in an unusual degree.

It seems probable that social and economic changes affect the relative proportions of the various types, and thus alter the constitution of the nation. The waxing and waning of various diseases quite probably leads to differential elimination, and thus again affects the constitution of the nation also. Perhaps a wise national policy would be one that sought to maintain in health and opportunity a great variety of human stock, in order to obtain richness of constructive activities, as well as of mutually critical tendencies; questions relating to distribution and changes of distribution of race-types would thus very probably be of great public importance, could they but be examined in sufficient detail.

In agricultural days, the rather broad-headed, somewhat fair type we know as John Bull may have been very characteristic of the yeomanry, just as the Nordic type was prominent among the hunting aristocracy, and the Beaker-Maker type is among the intellectuals. Much land in South Britain has recently gone back from crops to pasture, and in several districts old farmhouses of the wheat-growers are in the hands of rougher stock-rearers, who as yet care little for their amenities, and let them decay. They live more cheaply and roughly, and, taking them all in all, they show a larger proportion of the Neolithic type than was probably living on the land in the corn-growing days.

The growth of the large agglomerations called industrial towns has led to much immigration from the country, and in the second generation of big-town life, under the poor average conditions of the British industrial area, it would seem that the Neolithic or Mediterranean type increases in conspicuous fashion. Nordic

types apparently do not easily withstand pathogenic influences of the big town, and it is said that they form a large proportion of those who emigrate from England to newer lands.

The moorlands and hill country, again, have limited possibilities and tend to export men (again of Neolithic type to a large extent) to the large towns and to the plains below the hills. The west of the English Midlands is full of Welsh family names.

Various causes have thus conspired to bring about, as it were, a resurgence of the fundamental type in our population, with interesting consequences. Beddoe and others have more or less assumed that this resurgence is necessarily bad, and that it is "superior" types that are going. That is probably begging some rather large questions, or, it may be, economizing thought by uncritical acceptance of theories developed abroad in support of what has been inaccurately termed Teutonic race-pride. It would be truer to picture each stock making its own contributions to the commonwealth and to argue for adequate opportunities for each. France is a great example of richness in thought and effort of many kinds, and this is not unconnected with the richness of admixture of types of European stocks in its population, and the variety of environment and opportunity available.

Another point of general interest may be mentioned. It is now customary to examine physically school-children and others, and it would be useful to work towards discrimination of types in connection with such research, as well as to study sequences of the growth-phenomena for the various types. It might, of course, be found that, during phases of growth, the individual works through different phases of its complex racial inheritance. Some types doubtless have small measurements, and it is unwise, in such case, to put down a "bad" set of measurements entirely to unhealthy conditions. Better conditions, none the less, will probably bring increased measurements of most types, but, with town-planning, might also increase the proportion of those non-Neolithic types again, if it be a fact that they have dangerously diminished.

Again, to the making of our present social system in bygone centuries it is probable that, owing to circumstances at the time, the non-Neolithic population contributed a predominant share. It is thus not surprising that maladjustments are but too apparent in districts where a dense modern population is mainly of moorland origin, and has thus come down into a society adapted to other thoughts and other inherent traits.

What the psychical tendencies of the various types may be is not for us to argue; very little is as yet known as to correlation of physical and psychical type. We have, indeed, given hints as to occupations frequently followed by the different types, but we must add that the occupation is often, doubtless, only indirectly correlated with the type and much more directly with the place of upbringing, whether moorland or estuary or valley-cleft.

It is useless at present to attempt to appraise the various constituent stocks of the population, but everything points to the importance of maintaining all at their

best physical and intellectual levels, with all their varied accumulations of tradition for the enrichment of the commonwealth.

We are deeply indebted to the Guild of Graduates of our University of Wales for its assistance in the form of an annual grant and its continual encouragement of the work, and to a host of friends throughout Wales who have helped to make our head-hunts successful. Messrs. J. Thomas and Ll. T. Jones have done a great deal of work for us in Harlech and Tregaron. We owe a special tribute of personal gratitude to our friends, the late Professor Sir Edward Anwyl, the late Professor Herbertson, and the late Sir John Rhys. Dr. Haddon, Professor J. L. Myres, and Mr. H. J. E. Peake have given help and suggestion repeatedly, and to them also do we tender our warmest thanks. The Royal Society very generously gave us an initial grant towards purchase of instruments and a further grant of £50 for 1914 to meet the expenses of secretarial work towards the laborious final analysis of results. Mr. Flattely, Mr. D. R. Jones, and Mr. Whitehouse gave great help in drawing maps and taking photographs for us, and our best thanks are also due to the friends who have allowed us to use their photographs as illustrations of types and to the photographers who took pains to depict them appropriately. Mr. J. H. Shaxby, B.Sc., has helped at many different stages. To Dr. Lynn Thomas and Sir E. Vincent Evans, C.B., also, we wish to express our grateful thanks.

Finally, we wish to offer our thanks to Professor Arthur Keith, the President of the Institute, for his interest in this work, and to Sir Thomas Wrightson, Bart., for most generous help which has very greatly improved the illustration of this paper, and has thus made it far more complete than it could otherwise have been.

UNIVERSITY COLLEGE OF WALES,
ABERYSTWYTH.

October, 1915.



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